

Care & Cure: Reducing Cognitive Decline Among Elderly Patients in Healthcare Settings by way of  
Caring Architectural Principles

by

Brianna Lafrenière

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**APPROVED/APPROUVÉ**

Thesis Examiners/Examineurs de thèse:

Steven Beites  
(Thesis Advisor / Directeur(trice) de thèse)

Amey Brocklebank  
(Thesis Second Reader / Deuxième lecteur(trice) de thèse)

Janna Levitt  
(External Examiner / Examineur(trice) externe)

Approved for the Office of Graduate Studies  
Approuvé pour le Bureau des études supérieures  
Tammy Eger, PhD  
Vice-President, Research (Office of Graduate Studies)  
Vice-rectrice à la recherche (Bureau des études supérieures)

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**Abstract:**

In hospitals, cognitive decline in patients 65 years and older is common which affects their entire well-being and recovery process. How can architecture uphold responsibility with the same gravity as the Hippocratic Oath to “do no harm” for geriatric patients’ well-being to promote spaces for recovery while diminishing prolonged acute care side effects, ensuring that cognitive decline is reduced among this vulnerable population? The creation of an Integrative Geriatric Centre in Sudbury Ontario, Canada which contains a geriatric assessment clinic, a geriatric recovery centre, and an integrated childcare facility will provide betterment for seniors. These programmatic elements will use the ideologies of positive distraction in intergenerational settings; biophilic design; and a framework for senior friendly hospital design. These principles will help reduce cognitive decline as senior care continues its evolution into spaces filled with therapeutic architecturally driven elements.

**Key terms:**

Architecture, Cognitive Decline, Geriatrics, Intergenerational Care, Elderly Care, Biophilia, Hospital, and Sudbury, Ontario.



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# TABLE OF CONTENTS

v	<i>Abstract:</i>
v	<i>Key terms:</i>
vii	<i>Acknowledgements</i>

## 1 INTRODUCTION

### **CHAPTER 1:** *THE ISSUE OF COGNITIVE DECLINE FOR ELDERLY PATIENTS*

3	<i>Introduction</i>
7	<i>1.1 Affected Population</i>
9	<i>1.2 Medical Conditions &amp; the Elderly</i>
	<i>1.2.1 Experiential Experiment</i>
15	<i>1.3 Patients &amp; the Built Environment</i>
	<i>1.3.1 Waiting Rooms</i>
	<i>1.3.2 Sudbury's Recovery Facilities</i>
21	<i>1.4 Risk as the Issue</i>
22	<i>Conclusion</i>

### **CHAPTER 2:** *HEALTH & ARCHITECTURE*

23	<i>Introduction</i>
25	<i>2.1 Importance of Biophilia in Healing Environments</i>
31	<i>2.2 Geriatric Centres &amp; Senior Friendly Hospital Design</i>
34	<i>2.3 Positive Distraction &amp; the Familiarity of a Child</i>
38	<i>Conclusion</i>

**CHAPTER 3: PROGRAM, SITE & ARCHITECTURE**

39	<i>Introduction</i>
41	<i>3.1 Geriatric Assessment Clinic</i>
44	<i>3.2 Healing Centre</i>
47	<i>3.3 Childcare Facility and Intergenerational Relationships</i>
49	<i>3.4 Site Analysis</i>
55	<i>3.5 Integrative Geriatric Centre</i>
	<i>3.5.1 Program</i>
	<i>3.5.2 Site Design</i>
	<i>3.5.3 Biophilic Design Elements</i>
	<i>3.5.4 Senior Friendly Design Elements</i>
	<i>3.5.5 Intergenerational Interactions</i>
98	<i>Conclusion</i>
99	<i>CONCLUSION</i>
103	<i>BIBLIOGRAPHY</i>

# LIST OF FIGURES

**Figure 1.1:** *Risks that the Elderly Take*, by author, October 2021

**Figure 1.2:** *North East Specialized Geriatric Centre Services*, by author, 2021

Information from: 'North East Specialized Geriatric Centre (Sudbury, Ontario)'. Accessed 8 November 2021. <https://www.nesgc.ca/>.

**Figure 1.3:** *Percentage of Population Aged 65 years and over, Canada 1971-2061*, by author, October 2021

Data from: Statistics Canada government of Canada, 'research highlights on health and aging', 28 July 2016, <https://www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2016001-eng.htm>.

**Figure 1.4:** *Sudbury's age distribution by percentage 2016*, by author, November 2021

Data from: Statistics Canada Government of Canada, 'Census Profile, 2016 Census - Sudbury [Population Centre], Ontario and Ontario [Province]', 8 February 2017,

**Figure 1.5:** *Canadian Senior Statistics 2016*, by author, November 2021

Data from: Statistics Canada government of Canada, 'research highlights on health and aging', 28 July 2016, <https://www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2016001-eng.htm>.  
<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&-Geo1=POPC&Code1=0904&Geo2=PR&Code2=35&SearchText=Sudbury&SearchType=Begins&Search-PR=01&B1=All&GeoLevel=PR&GeoCode=0904&TABID=1&type=0>.

**Figure 1.6:** *Sensory Impairment Diagram*, by author, February 2022

Inspired by: Mazuch, Richard. 'Salutogenic and Biophilic Design as Therapeutic Approaches to Sustainable Architecture', n.d.

**Figure 1.7:** *View Master for Empathy*, by author, April 2021

**Figure 1.8:** *Evolution of the Hospital Typology (detailed)*, by author, October 2021

**Figure 1.9:** *Sudbury Geriatric Healthcare Services*, by author, November 2021

**Figure 1.10:** *Geriatric Healthcare Services Flowchart*, by author, November 2021

**Figure 1.11:** *Hospital Stressors for Seniors*, by author, November 2021

**Figure 2.1:** *Evolution of the Hospital Typology*, by author, October 2021

Based on diagram in: Adams, Annmarie. 'Canadian Hospital Architecture: How We Got Here'. *CMAJ: Canadian Medical Association Journal* 188, no. 5 (15 March 2016): 370–71. <https://doi.org/10.1503/cmaj.151233>.

**Figure 2.2:** Photograph from: 'Alvar Aalto, Fabrice Fouillet· Paimio Sanatorium', Divisare, accessed 5 November 2021, <https://divisare.com/projects/386217-alvar-aalto-fabrice-fouillet-paimio-sanatorium>.

**Figure 2.3:** Photograph from: 'Alvar Aalto, Fabrice Fouillet· Paimio Sanatorium', Divisare, accessed 5 November 2021, <https://divisare.com/projects/386217-alvar-aalto-fabrice-fouillet-paimio-sanatorium>.

**Figure 2.4:** Photograph from: 'Alvar Aalto, Fabrice Fouillet· Paimio Sanatorium', Divisare, accessed 5 November 2021, <https://divisare.com/projects/386217-alvar-aalto-fabrice-fouillet-paimio-sanatorium>.

**Figure 2.5:** Photograph from: 'Alvar Aalto, Fabrice Fouillet· Paimio Sanatorium', Divisare, accessed 5 November 2021, <https://divisare.com/projects/386217-alvar-aalto-fabrice-fouillet-paimio-sanatorium>.

**Figure 2.6:** Photograph from: ArchDaily. 'Gallery of Maggie's Cancer Centre Manchester / Foster + Partners - 58'. Accessed 24 March 2022. <https://www.archdaily.com/786370/maggies-cancer-centre-manchester-foster-plus-partners/59774d55b22e38c1b80007c0-maggies-cancer-centre-manchester-foster-plus-partners-roof-plan-color>.

**Figure 2.7:** Photograph from: 'Maggie's Manchester | Projects | Foster + Partners', accessed 7 December 2021, <https://www.fosterandpartners.com/projects/maggie-s-manchester/>.

**Figure 2.8:** Photograph from: ArchDaily. 'Gallery of Maggie's Cancer Centre Manchester / Foster + Partners - 58'. Accessed 24 March 2022. <https://www.archdaily.com/786370/maggies-cancer-centre-manchester-foster-plus-partners/59774d55b22e38c1b80007c0-maggies-cancer-centre-manchester-foster-plus-partners-roof-plan-color>.

**Figure 2.9:** Photograph from: ArchDaily. 'Gallery of Maggie's Cancer Centre Manchester / Foster + Partners - 58'. Accessed 24 March 2022. <https://www.archdaily.com/786370/maggies-cancer-centre-manchester-foster-plus-partners/59774d55b22e38c1b80007c0-maggies-cancer-centre-manchester-foster-plus-partners-roof-plan-color>.

**Figure 2.10:** Geriatric Ward vs.General Medicine Ward, by author, January 2021.

Information based on: Asplund, K., Y. Gustafson, C. Jacobsson, G. Bucht, A. Wahlin, J. Peterson, J. O. Blom, and K. A. Angquist. 'Geriatric-Based versus General Wards for Older Acute Medical Patients: A Randomized Comparison of Outcomes and Use of Resources'. *Journal of the American Geriatrics Society* 48, no. 11 (2015): 1381–88. <https://doi.org/10.1111/j.1532-5415.2000.tb02626.x>

**Figure 2.11:** Photograph from: ArchDaily. 'Gallery of Maggie's Cancer Centre Manchester / Foster + Partners - 58'. Accessed 24 March 2022. <https://www.archdaily.com/786370/maggies-cancer-centre-manchester-foster-plus-partners/59774d55b22e38c1b80007c0-maggies-cancer-centre-manchester-foster-plus-partners-roof-plan-color>.

**Figure 2.12:** Photographs from: St Joseph’s Home (Singapore). ‘Infant and Childcare - Gallery’. Accessed 6 December 2021. <https://stjh.org.sg/infant-and-childcare-gallery/>.

**Figure 2.13:** Photographs from: St Joseph’s Home (Singapore). ‘Infant and Childcare - Gallery’. Accessed 6 December 2021. <https://stjh.org.sg/infant-and-childcare-gallery/>.

**Figure 2.14:** Photograph from Monsebraaten, Laurie. ‘Magic Abounds When Daycare, Seniors Home Share Roof’. *The Toronto Star*, 9 February 2016, sec. GTA. <https://www.thestar.com/news/gta/2016/02/09/magic-abounds-when-daycare-seniors-home-share-roof.html>.

**Figure 3.1:** Program Parti Diagram, by author, February 2022.

**Figure 3.2:** C. B. C. News , ‘Hallway Overcrowding at Health Sciences North Goes from “bad to Worse,” Says NDP | CBC News’, CBC, 5 November 2019, <https://www.cbc.ca/news/canada/sudbury/ndp-hallway-medicine-1.5348899>.

**Figure 3.3:** Assessment Clinic Relationship Diagram, by author, February 2022.

**Figure 3.4:** Geriatrics Healing Centre Relationship Diagram, by author, February 2022.

**Figure 3.5:** Childcare Facility Relationship Diagram, by author, February 2022.

**Figure 3.6:** Improved Sudbury Geriatrics Healthcare Services, by author, November 2021

**Figure 3.7: 1.** Photograph of Laurentian across Bethel Lake, by author, March 2022.

**2.** Photograph across Bethel Lake, by author, March 2022.

**3.** Photograph from: Rainbow Routes Association. ‘Bethel Lake Trail (TGT)’. Accessed 16 February 2022. <https://www.rainbowroutes.com/bethel-lake-trail-tgt>.

**Figure 3.8:** Bethel Lake Site, by author, January 2022.

**Figure 3.9:** Panoramic Photograph of Bethel Lake, by author, March 2022

**Figure 3.10:** Site Plan of Building Location and Orientation, by author, June 2022

**Figure 3.11:** Building Shape Diagram, by author, August 2022

**Figure 3.12:** Active/Passive Pictogram, by author, August 2022

**Figure 3.13:** Building Shape Evolution Diagrams, by author, August 2022

**Figure 3.14:** Programmatic Aerial Perspective, by author, June 2022

**Figure 3.15:** Program Adjacency Diagram, by author, August 2022

**Figure 3.16:** South Section, by author, July 2022

**Figure 3.17:** Ground Floor Plan, by author, May 2022

**Figure 3.18:** Second Level Floor Plan, by author, May 2022

**Figure 3.19:** Second Floor Plan of Geriatric Assessment Clinic and Rehabilitation Centre, by author, August 2022

**Figure 3.20:** Ground Floor Plan of Geriatric Assessment Clinic and Rehabilitation Centre, by author, August 2022

**Figure 3.21:** Render of Geriatric Assessment Clinic Waiting Lounge, by author, June 2022

**Figure 3.22:** Second Floor Plan of Healing Centre, by author, August 2022

**Figure 3.23:** Ground Floor Plan of Healing Centre, by author, August 2022

**Figure 3.24:** Second Floor Plan of Childcare Facility, by author, August 2022

**Figure 3.25:** Ground Floor Plan of Childcare Facility, by author, August 2022

**Figure 3.26:** Render of Gross Motor Play Area, by author, June 2022

**Figure 3.27:** Site Plan of Parking, by author, June 2022

**Figure 3.28:** *Aerial Perspective of Outdoor Areas, by author, July 2022*

**Figure 3.29:** *Vignettes of Outdoor Spaces, by author, August 2022*

**Figure 3.30:** *Render of Healing Centre's Outdoor Exercise Area, by author, July 2022*

**Figure 3.31:** *Render of Courtyard, by author, June 2022*

**Figure 3.32:** *Render of Patient Hallway, by author, June 2022*

**Figure 3.33:** *Building Section, by author, July 2022*

**Figure 3.34:** *Render of Rooftop Patio, June 2022*

**Figure 3.35:** *Render of Patient Balcony and View across Bethel Lake, by author, June 2022*

**Figure 3.36:** *North Elevation, by author, July 2022*

**Figure 3.37:** *South Elevation, by author, July 2022*

**Figure 3.38:** *Circulation Diagram, by author, July 2022*

**Figure 3.39:** *Render of Dining Hall from Mezzanine, by author, June 2022*

**Figure 3.40:** *Render of Kid's Loft, by author, June 2022*

**Figure 3.41:** *Second Floor Plan of Intergenerational Interactions, by author, August 2022*

**Figure 3.42:** *Ground Floor Plan of Intergenerational Interactions, by author, August 2022*

**Figure 3.43:** *Aerial Perspective of Integrative Geriatrics Centre, by author, June 2022*

# INTRODUCTION

Hospitals can be an intimidating place for anyone who enters, especially for the senior population. The florescent lighting, distinct sterile feel and smell along with a hospital's complex layout due to the scale can leave patients with feelings of fear and stress. Now add on top of that all the medical issues and emotional stress which leads to the cognitive decline of elders facing this challenge. The modern medical hospitals have evolved over the decades. According to the Pan American Health Organization, there are several considerations that need to be made prior to the completion of a hospital's design. "The architectural design of health facilities is a difficult task in which the architect must deal with a very broad range of questions that cover, in addition to the construction of the building, other aspects related to the characteristics of the potential user community, such as the birth rate, morbidity and mortality rates, and micro and macro socioeconomic and geographical considerations."<sup>1</sup> This is both true for general medical wards as well as more

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1 'Characteristics of Hospital Design', accessed 20 December 2021, <http://www.nzdl.org/cgi-bin/library?e=d-00000-00---off-0paho--00-0----0-10-0---0---0direct-10---4-----0-1l--11-en-50---20-about---00-0-1-00-0--4----0-0-11-10-0utfZz-8-10&cl=CL1.2&d=HASH74eeabad6996d438a1f68f.6.1&gt=1>.

specific health facilities such as my proposal of an Integrative Geriatric Centre. This will include a Geriatric Assessment Clinic, a Healing Centre, and a Childcare Centre.

In the following thesis essay, I will be embarking on the question of:

*How can architecture uphold responsibility with the same gravity as the Hippocratic Oath to “do no harm” for geriatric patients’ well-being to promote spaces for recovery while diminishing prolonged acute care side effects, ensuring that cognitive decline is reduced?*

To answer this and fully comprehend all ties linking to cognitive decline and the elderly. Chapter 1 will be dedicated to the issues at hand, finding and understanding why cognitive decline is common among the elderly in clinical environments. Chapter 2 will be focused on different kinds of historic and innovative solutions that have been helpful in aiding the elderly while placed in hospitals which will inform the decisions taken for my own geriatric recovery facility. Chapter 3 will describe the programmatic elements to be implemented into the design to ensure for a successful facility for senior patients, as well as describe the overall architectural resolution of the project.

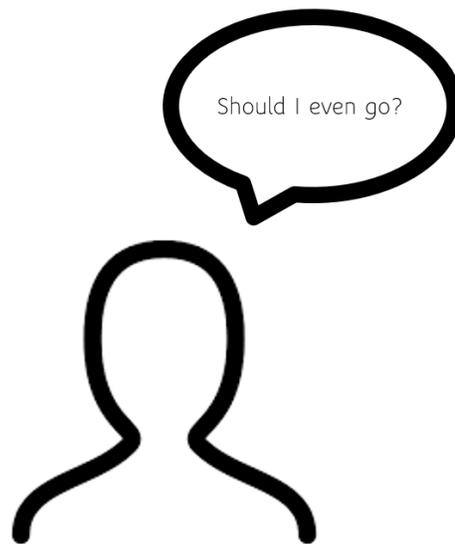
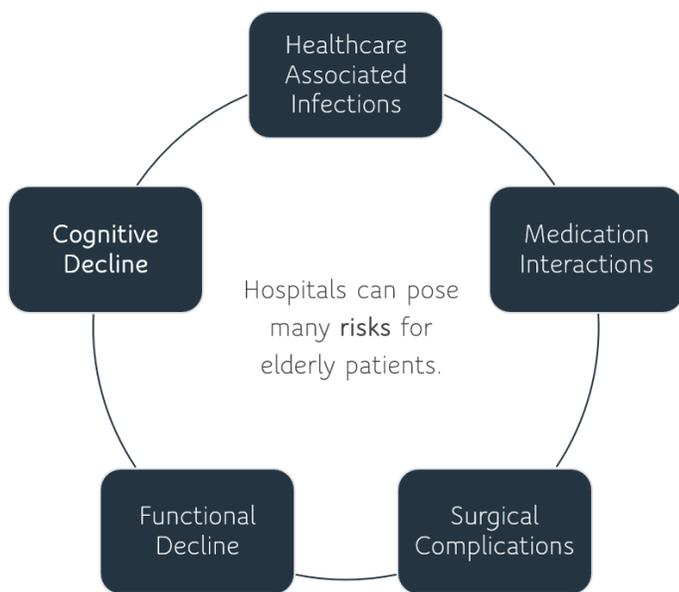
# CHAPTER 1: THE ISSUE OF COGNITIVE DECLINE FOR ELDERLY PATIENTS

## Introduction

The hospital is a place where people go to receive medical attention in the hopes that they leave feeling better than they did upon entry. However, the reality is that for seniors this is not always the case. There are always risks and it is ultimately up to the patient to come to the conclusion of which medical route they wish to follow. Seniors are unaware when entering the hospital for treatment that they may be risking other aspects of their health (Figure 1.1). As stated by Sarah B. Mathews M.D., Steven E. Arnold M.D. and C. Neill Epperson M.D in the American Journal of Geriatric Psychiatry, “Hospitals can be dangerous places for older patients, with increased risk of nosocomial infections, medication interactions, delirium, surgical complications, and functional decline.”<sup>2</sup> Another concern for the medical community is a patient’s cognitive decline as this can affect all other aspects of the patient’s recovery process. “The risk for the development of cognitive decline is of course concerning due to the morbidity and mortality associated with cognitive

---

2 Sarah B. Mathews, Steven E. Arnold, and C. Neill Epperson, ‘Hospitalization and Cognitive Decline: Can the Nature of the Relationship Be Deciphered?’, *The American Journal of Geriatric Psychiatry* 22, no. 5 (2014): 465–80, <https://doi.org/10.1016/j.jagp.2012.08.012>.



**Figure 1.1 (Above):** These are the risks that patients face when going into the hospital.

impairment and dementia, which leads to functional decline, worsening medical condition, increasing dependency and care needs, and institutionalization.”<sup>3</sup> One answer to the avoidance of hospital visits was the introduction of home therapy and support which was first conceived in 1948 with the publication of *The Social Medicine of Aging* by Joseph Sheldon.<sup>4</sup> His research introduced home physiotherapy and helped with environmental modification to the home to prevent falls.<sup>5</sup>

The current thinking follows on the same line as a 2016 report on senior care in Canada. Currently there is an emphasis on trying to keep elderly patients at home for as long as possible. Some strategies used are home and community support, by supporting informal caregivers through education and resources.<sup>6</sup> According to the report, Ontario placed emphasis on this type of support so that the elderly can remain in home.<sup>7</sup> In Sudbury Ontario, there is an organization to help in the aid of seniors staying home as much as possible and this is through the efforts of the North East Specialized Geriatric Centre (Figure 1.2). However, remaining at home is not always an option and patients must go into the hospital due to serious illness, disease, or accidents. Seniors are often times patients with several medical issues which makes their treatment process more complicated and intertwined with several different department in hospital facilities.

**Figure 1.2 (Right):** The North East Specialized Geriatric Centre has several programs that patients can consult. Here they are listed out with some information about each. This organization is affiliated with Health Sciences North in Sudbury Ontario.

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3 Mathews, Arnold, and Epperson.

4 J. E. Morley, 'A Brief History of Geriatrics', *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 59, no. 11 (1 November 2004): 1132–52, <https://doi.org/10.1093/gerona/59.11.1132>.

5 Morley.

6 'The State of Seniors Health Care in Canada' (Canadian Medical Association, September 2016).

7 'The State of Seniors Health Care in Canada'.



## **NORTH EAST SPECIALIZED GERIATRICS CENTRE**

### ***REACTIVATION CARE UNIT:***

- 20 BED ACUTE INPATIENT UNIT CARING FOR PATIENTS 65 YEARS +
- ADMITTED TO HOSPITAL WHO HAVE HAD A DECLINE IN HEALTH STATUS,
- DEMONSTRATE RESTORATIVE POTENTIAL

### ***INPATIENT CONSULTATION SERVICES (FORMERLY COACH):***

- PROVIDE RECOMMENDATIONS FOR IMPROVING OUTCOMES, RESTORING INDEPENDENCE AND SUPPORTING PATIENTS' TRANSITION BACK TO THE COMMUNITY.

### ***GERIATRICS OUTPATIENT REHABILITATION SERVICE:***

- REHABILITATION FOR PATIENTS WITH RECENT FUNCTIONAL DECLINE
- 6 TO 12 WEEKS IN THIS PROGRAM.

### ***GERIATRICS MENTAL HEALTH OUTREACH SERVICE:***

- PROVIDE ASSESSMENT, TREATMENT, COUNSELLING, AND THERAPEUTIC INTERVENTION FOR OLDER ADULTS WITH LATE ONSET OR WORSENING MENTAL HEALTH. IN HOME AND COMMUNITY SETTING, ACUTE CARE AND TRANSITIONAL SETTINGS.

### ***REGIONAL OUTPATIENT GERIATRIC MEDICINE SERVICE:***

- GERIATRIC CONSULTATION TO PATIENTS LIVING ACROSS THE NORTHEAST WHO LIVE MORE THAN AN HOUR AWAY FROM A GERIATRIC MEDICINE CLINIC.

### ***BEHAVIOURAL SUPPORT OUTREACH SERVICE:***

- PROVIDE ASSESSMENT, TREATMENT AND OPTIMAL PERSON-CENTRED CARE TO MEET BEHAVIOURAL, EMOTIONAL, PSYCHOSOCIAL, AND PHYSICAL NEEDS.

## 1.1 Affected Population

In Canada, the elderly population is on the rise. In 2021, people 65 year and older made up over 18.5% of the population and by 2061 it is estimated that a quarter Canadians will be facing their golden years (Figure 1.3).<sup>8</sup> The majority of Canadian seniors (92.1%) live in private dwellings while 7.9% live in care facilities. Of those who live independently, 27.9% live alone and nearly half of them are senior women.<sup>9</sup> This therefore can be interpreted that the other 72.1% live with their significant other, family members or friends. These networks are important as a person ages. These people often become key members that ensure their physical and social well-being, and in some cases become their caregivers.

Aging is a result of molecular and cellular damage over time thus, there is a decrease in physical capabilities, immune response and mental capacity thereby increasing the risk of disease or medical issues in the elderly.<sup>10</sup> It is common among seniors to suffer from several conditions at the same time.<sup>11</sup> Thereby making those 65 years and over the most common demographic to use the healthcare system. In Canada, 98% of the elderly population have a family doctor or regular place of care, however it is difficult for them to book a same day or next day appointment with

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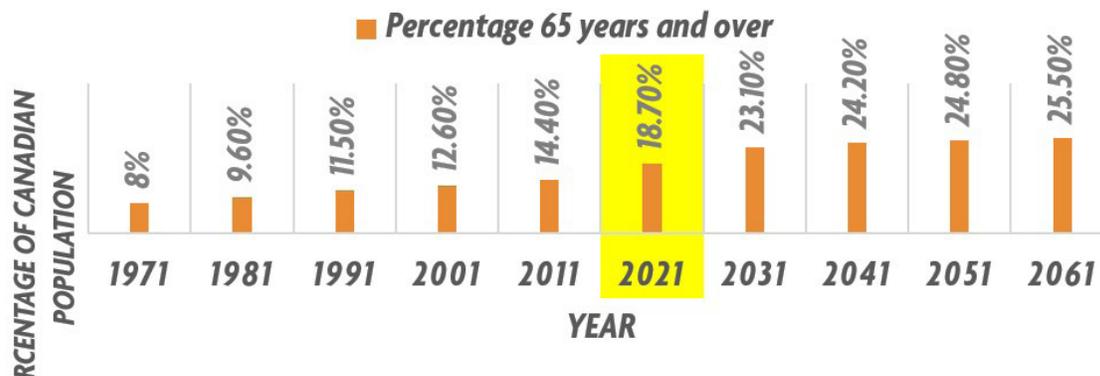
8 Statistics Canada government of Canada, 'research highlights on health and aging', 28 July 2016, <https://www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2016001-eng.htm>.

9 Public Health Agency of Canada, 'Aging and Chronic Diseases: A Profile of Canadian Seniors', education and awareness, 16 December 2020, <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/aging-chronic-diseases-profile-canadian-seniors-executive-summary.html>.

10 'Ageing and Health', accessed 12 December 2021, <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>.

11 'Ageing and Health'.

## PERCENTAGE OF POPULATION AGED 65 YEARS AND OVER, CANADA, 1971-2061



**Figure 1.3 (Above):** The percentage of seniors in Canada are on the rise. This chart indicates the senior population percentage from 1971 and projects it to 2061

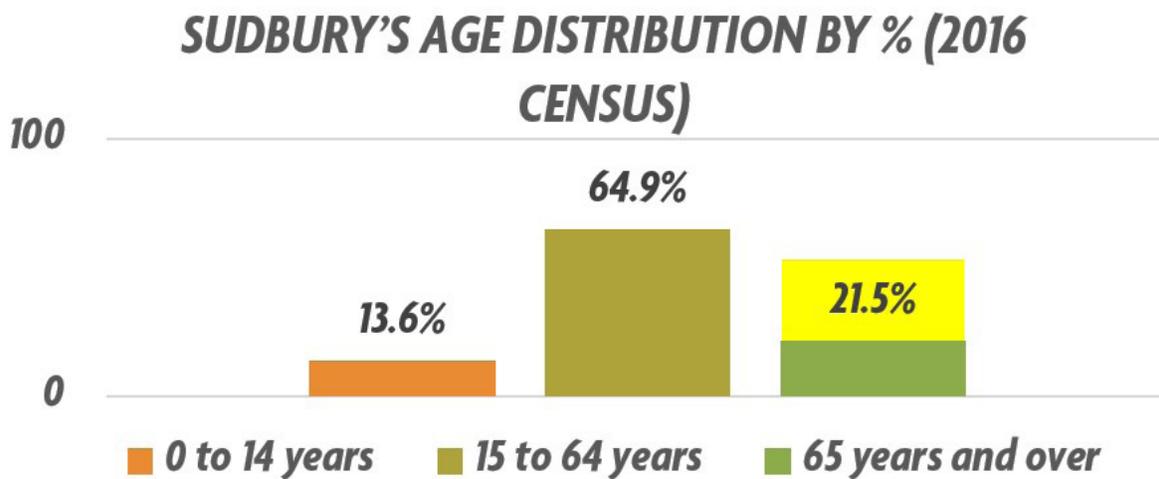
their doctor, therefore making them more likely to use the emergency department at the hospital.<sup>12,13</sup> Once in hospital, if it is not a serious life-threatening problem, they must wait in the emergency room like any other person. Sadly, in Ontario wait times can be long and uncomfortable. Currently, the average wait times for patients to receive their first assessment ranges around 1.9 hours.<sup>14</sup> Sudbury, the largest medical centre in Ontario's North East health district is on trend with the provincial average wait times at 1.9 hours as well.<sup>15</sup> Interestingly, Sudbury's elderly population is above the national average as 1 in 5 people are over the age of 65 (Figure 1.4), meaning that these seniors who are seeking immediate medical attention must wait a significant amount of time before even being assessed at the hospital.

12 'The State of Seniors Health Care in Canada'.

13 Ibid.

14 'Emergency Department Time Spent by Patients in Ontario – Health Quality Ontario (HQO)', accessed 20 December 2021, [https://www.hqontario.ca/System-Performance/Time-Spent-in-Emergency-Departments?utm\\_source=Ontario.ca&utm\\_medium=Referral&utm\\_campaign=WT%20Referral](https://www.hqontario.ca/System-Performance/Time-Spent-in-Emergency-Departments?utm_source=Ontario.ca&utm_medium=Referral&utm_campaign=WT%20Referral).

15 'Emergency Department Time Spent by Patients in Ontario – Health Quality Ontario (HQO)'.

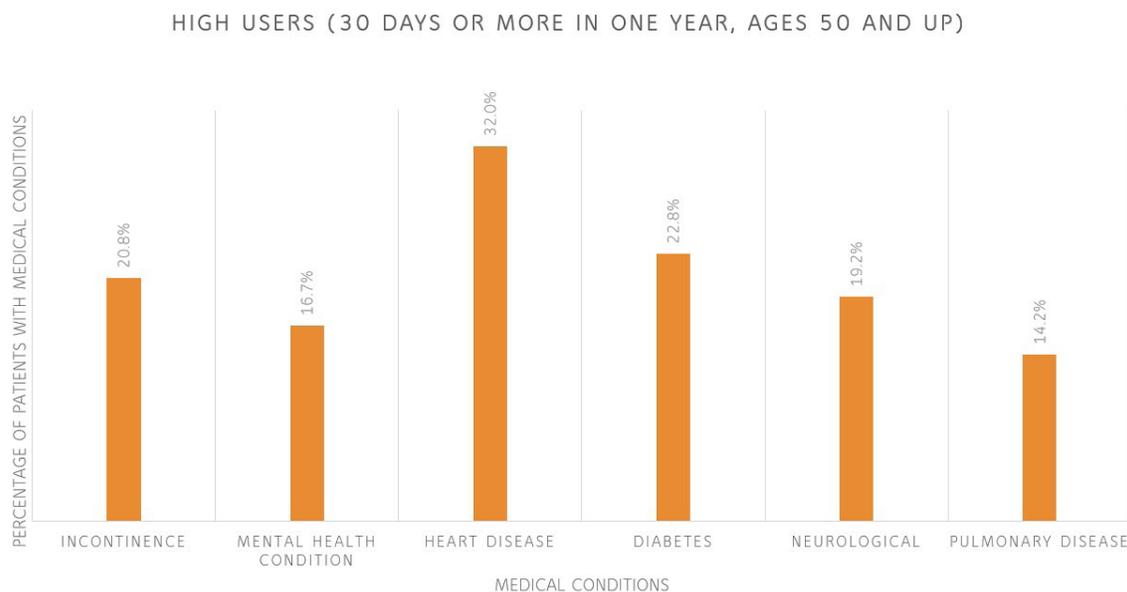


## *1.2 Medical Conditions & the Elderly*

In Canada, the most common ailments that effect older populations are heart disease, diabetes and incontinence (Figure 1.5).<sup>16</sup> In Sudbury, the leading causes for death are Ischemic Heart Disease (19.2% of deaths in the city), Lung Cancer (9%) and Stroke (5%). As people age, they are more susceptible to changes in the body that they had not experienced in their youth. Of course, this is a natural process, yet it is important to understand the difficulties that elders face that are often times overlooked in architecture. Some examples of challenges that seniors face in the built environment include: accessibility, visual understanding of spaces, and auditory comfort in spaces.

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16 Statistics Canada Government of Canada, 'High Use of Acute Care Hospital Services at Age 50 to 74', 20 September 2017, <https://www150.statcan.gc.ca/n1/pub/82-003-x/2017009/article/54855/tbl/tbl01-eng.htm>; Statistics Canada Government of Canada, 'High Use of Acute Care Hospital Services at Age 75 or Older', 20 September 2017, <https://www150.statcan.gc.ca/n1/pub/82-003-x/2017009/article/54855/tbl/tbl02-eng.htm>.



**Figure 1.4 (Left):** The percentage of seniors in Sudbury according to the 2016 census.

**Figure 1.5 (Above):** This graph showcases which medical issues affect Canadian 50 years and above the most.

Understanding their perception of the world is extremely important so that geriatric healing facilities can better serve the users. This age group is more likely to have visual impairments, hearing difficulties, skeletal and muscle changes, dealing with one or more medical conditions, as well as cognitive decline associated with aging.<sup>17</sup> Their understanding of space comparatively to younger users may vary drastically. For example, as people age, they are more likely to have decreased visual acuity, meaning that their visual field may be smaller as well as reduced peripheral vision and inaccurate depth perception. This may result in spaces being difficult to navigate and having less of an understanding of the larger scope of an area. Keeping rooms

17 Belinda Parke, Kathleen Friesen, and Fraser Health Authority (B.C.), *Code plus: Physical Design Components for an Elder Friendly Hospital* (Surrey, B.C.: Fraser Health Authority, 2007), [https://central.bac-lac.gc.ca/.item?id=Code\\_Plus&op=pdf&app=Library](https://central.bac-lac.gc.ca/.item?id=Code_Plus&op=pdf&app=Library).

intimate with proper lighting and uniform floor levels would be best for these people as they can feel more confident in their movements (Figure 1.6).

Delirium, a form of short-term cognitive decline, is also something that is more susceptible to persons 65 years and over.<sup>18</sup> It is important to understand delirium as a commonality that comes often times with the illness they are facing. Delirium is distinct from dementia as it develops over hours or days comparatively to months and years.<sup>19</sup> The effects are commonly short. It affects patients focus, attention span, short term memory, orientation of space and time, and hallucinations arise.<sup>20</sup> According to studies,

“Nearly 30 percent of older patients experience delirium at some time during hospitalization; the incidence is higher in intensive care units. Among older patients who have had surgery, the risk of delirium varies from 10 to greater than 50 percent.”<sup>21</sup>

Recognizing that delirium is common and a reality for patients is something to keep in mind while designing for this vulnerable population. There are however, proven strategies to help prevent delirium in seniors which includes: stimulating the mind, physical activity, sleeping well, having adequate hearing aids and glasses, staying hydrated, and eating well.<sup>22</sup>

**Figure 1.6 (Right):** This Diagram represents how the 5 senses are affected as sensory information passes from the macro scale to the neurological scale. Information is not perceived in the same “solid line” way as someone without ailments would.

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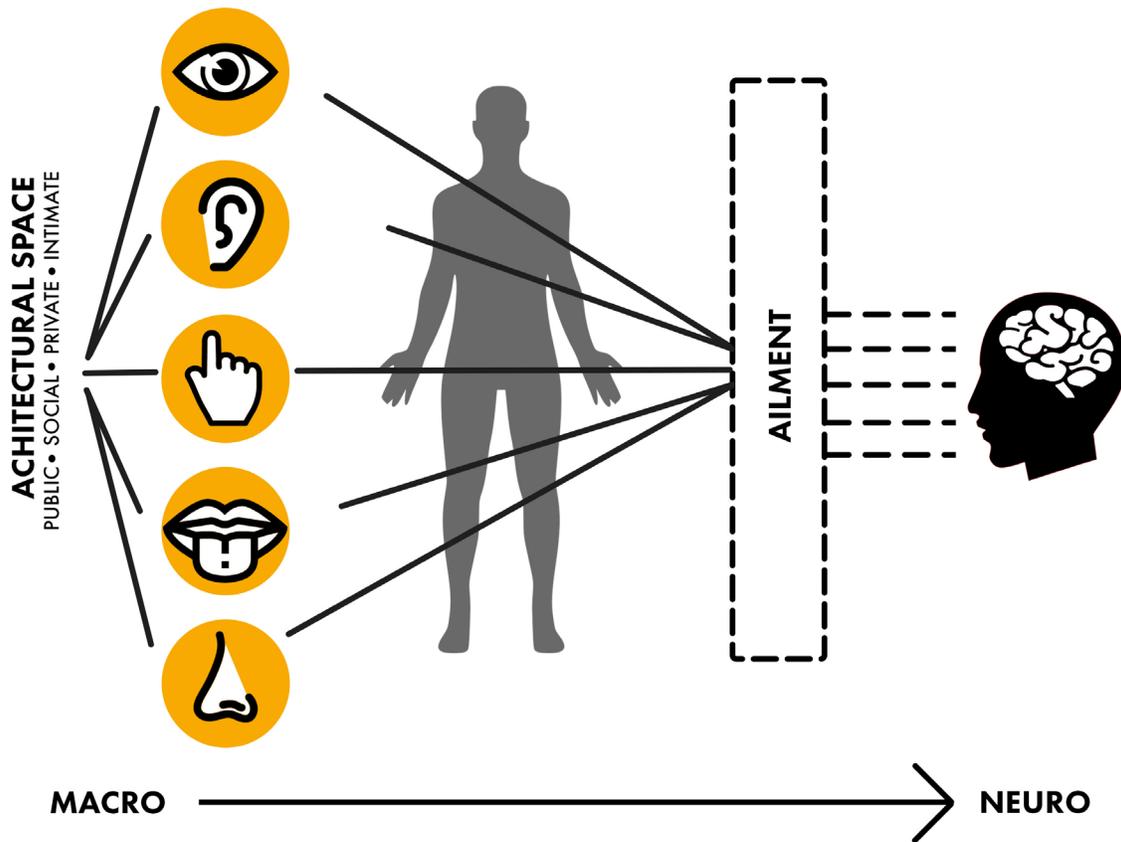
18 Joseph Francis and Bryan Young, ‘Patient Education: Delirium (Beyond the Basics)’, ed. Michael J. Aminoff and Kenneth Schmader, 16 February 2021, <https://www.uptodate.com/contents/delirium-beyond-the-basics/print>.

19 Francis and Young.

20 Ibid..

21 Ibid.

22 ‘SF7-Toolkit-Delirium.Pdf’, accessed 21 December 2021, <https://www.rgptoronto.ca/wp-content/uploads/2018/11/SF7-Toolkit-Delirium.pdf>.



**LESSENERD VISUAL ACUITY:**

- PERIPHERAL VISION
- DEPTH PERCEPTION
- FIELD OF VISION
- LOW LIGHT
- HIGH GLARE
- COLOUR DIFFERENTIATION
- CONTRAST DIFFERENTIATION



**HEARING CHANGES:**

- HIGH FREQUENCY SENSITIVITY
- DIFFICULTY DISTINGUISHING PITCH LEVELS
- AMBIENT NOISE INTERFERENCE
- SOUND DIRECTION DIFFICULTIES



**COGNITIVE CHANGES:**

- SLOWED INFORMATION PROCESSING
- DIFFICULTY WITH ORIENTATION, TIME AND PLACE
- SLOWER RESPONSE TO STIMULI
- DECREASED MEMORY
- SLOWED INFORMATION PROCESSING
- COMMUNICATION ABILITIES ALTERED



**SKELETAL & MUSCLE CHANGES:**

- 40%-60% REDUCED STRENGTH
- FLEXIBILITY REDUCED
- COORDINATION & FINE MOTOR REDUCTION
- DECREASED BALANCE
- REDUCED REACTION TIME
- DEXTERITY REDUCTION
- JOINT STIFFNESS - NECK INVOLVEMENT
- POOR GRIP
- LIMITED REACHING RANGE
- INCREASED FATIGUE

In a 2016 a study on sensory impairment, delirium, and functional recovery for critically ill elderly patients, has linked sensory impairment and delirium. They state, “[...] uncorrected sensory impairment leads to increased delirium; delirium then adversely affects hospital outcomes and subsequent recovery.”<sup>23</sup> Meaning that seniors who are experiencing vision problems or are hearing impaired without proper glasses or hearing aids are more susceptible of experiencing states of delirium while recovering from critical illness. Another research paper titled *A Multicomponent Intervention to Prevent Delirium in Hospitalized Older Patients*, suggests that small interventions can be made to help reduce the risk and length of delirium episodes for hospitalized seniors. To prevent the likelihood of delirium, interventions such as large illuminated keypads on telephones, large-print books, and fluorescent tape on call bells, helped patients who had visual impairments. In addition, patients with hearing impairments benefited from portable amplifying devices, and special communication techniques.<sup>24</sup> Considering that these small interventions made a difference, results on a larger architectural scale could make a big impact on patient well-being.

## 1.2.1 Experiential Experiment

The creation of a pair of goggles were made for this thesis project as a way to understand and empathize with seniors who are experiencing sensory impairments and to help guide the design decisions for improved architectural spaces. These goggles emulate common eye conditions

**Figure 1.7 (Right):** Images of View Master for Empathy. Four different lenses in the rotating cog showcase to the viewer different common geriatric vision ailments. These ailments include cataracts, glaucoma, macular degeneration and diabetic retinopathy.

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23 Sara C. LaHue and Vincent X. Liu, ‘Loud and Clear: Sensory Impairment, Delirium, and Functional Recovery in Critical Illness’, *American Journal of Respiratory and Critical Care Medicine* 194, no. 3 (1 August 2016): 252–53, <https://doi.org/10.1164/rccm.201602-0372ED>.

24 Sharon K. Inouye et al., ‘A Multicomponent Intervention to Prevent Delirium in Hospitalized Older Patients’, *New England Journal of Medicine* 340, no. 9 (4 March 1999): 669–76, <https://doi.org/10.1056/NEJM199903043400901>.



found in senior populations. For the purposes of this small experiment, cataracts, glaucoma, macular degeneration and diabetic retinopathy have been explored. Peering through them and looking into different spaces have rendered useful for design decisions but also created a sense of empathy for seniors facing vision problems (Figure 1.7).

This experiment paired with the recommendations of the research conducted by Fraser Health in their document *Code Plus: Physical Design Components for an Elderly Friendly Hospital* give a strong base on what kind of visual design decisions should be made to better the architectural experience for seniors. Bold patterning can play with senior's depth perception therefore it should also be avoided, however creating contrast to showcase important elements like important doorways and handrails are useful for patients.<sup>25</sup>

25 Parke, Friesen, and Fraser Health Authority (B.C.), *Code*

## 1.3 Patients & the Built Environment

Hospitals are not an ideal location for seniors to be spending time in. This is greatly due to the architectural and environmental stressors. The following paragraphs will identify specifically which architectural entities can pose problems to the users, beginning with the waiting room and moving through to the patient quarters. In addition, different support systems that Health Sciences North (HSN) in Sudbury has around the rest of the city will be explored in the section below.

Throughout history, there have been several different hospital models that have come and gone. This includes; the Victorian hospital typology (or the voluntary and custodial model), the Pavilion-Plan model, the Block Plan model and the Postmodern hospital (Figure 1.8). Currently, our hospitals in Canada resemble the block plan model and postmodern hospital. A typical Block Plan model includes several floors with the attachment of elevator systems, contains machinery for patient assessment, has double loaded corridors, prioritizes doctor functionality compared to patient comfort, and has between 1 to 4 patients per room.<sup>26</sup> The wards are specific to patient medical issues or body parts, for example, cardiology, oncology, maternity, etc. This would be the architectural typology one may think of when picturing the television series *General Hospital*.<sup>27</sup> The newer typology of the Postmodern hospital focuses on patient care first (this includes family members as well), and includes atriums and large lobby spaces. Upon entry, one may think they are in a shopping mall as it has a consumeristic feel with bright colours, art, large lobby spaces with shops, and

**Figure 1.8 (Right):** The evolution of the modern era hospital can be seen from the voluntary & custodial model to the postmodern hospital typology.

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Plus.

26 Annmarie Adams, 'Canadian Hospital Architecture: How We Got Here', *CMAJ: Canadian Medical Association Journal* 188, no. 5 (15 March 2016): 370–72, <https://doi.org/10.1503/cmaj.150735>.

27 Adams.

<p>1. </p>	<p>2. </p>	<p>3. </p>	<p>4. </p>
<ul style="list-style-type: none"> <li>-Construction and upkeep not government maintained</li> <li>-Hospitals by religion, race, gender, disease, etc.</li> </ul> <p>1870 &amp; Prior</p> <p>Voluntary &amp; Custodial</p>	<ul style="list-style-type: none"> <li>-Florence Nightingale's Environmental Theory</li> <li>-Government Funding</li> <li>-Open concept patient spaces.</li> <li>-H and E shaped massing.</li> </ul> <p>1870s-1930s</p> <p>Pavilion-Plan</p>	<ul style="list-style-type: none"> <li>-Use of elevator systems.</li> <li>-More reliant on machinery for patient assessment.</li> <li>-Doctor oriented hospital design.</li> <li>-Double loaded corridors.</li> <li>-Fewer patients per rooms.</li> </ul> <p>1930s-1980s</p> <p>Block Plan</p>	<ul style="list-style-type: none"> <li>-Hospitals resembling shopping malls</li> <li>-Use of biophilic design &amp; evidence based research for design.</li> <li>-Patient + family care</li> </ul> <p>1980s-Onward</p> <p>Postmodern Hospital</p>

in many cases large atrium spaces.<sup>28</sup> An example of this kind of hospital would be Toronto's Sick Kids Children's Hospital. In Sudbury, HSN would fall under the category of Block Plan typology.

Hospitals are institutions which can be classified as uncomfortable spaces to dwell in. The double loaded corridors are helpful in reducing the amount of walking that staff need to do, however, they prevent natural daylight from entering the circulatory arteries of the building. This makes them feel very institutional and influences people's circadian rhythm, affecting patients, staff, and visitors. These long winding corridors also affect how people perceive their orientation within these large buildings.

### 1.3.1 Waiting Rooms

Spaces in which patients wait in are often times dull, with uncomfortable seating, and have bright florescent lights so that nurses can keep an eye on patients. To occupy patients, there are often times televisions located in those spaces, however they only play ads or dull daytime shows. People wait there hours on end not knowing when exactly they will be seen. There are other patients waiting who have their own medical issues and to some, seeing others' medical conditions may be stressful or disturbing. According to a study conducted on cancer patients, 83% indicated that waiting has an emotional toll on them.<sup>29</sup>

“In many Ontario hospitals, having many patients waiting for care elsewhere can lead to overcrowding, with patients receiving care in hallways because no regular beds are available. This overcrowding is often most visible in hospital emergency departments.”<sup>30</sup>

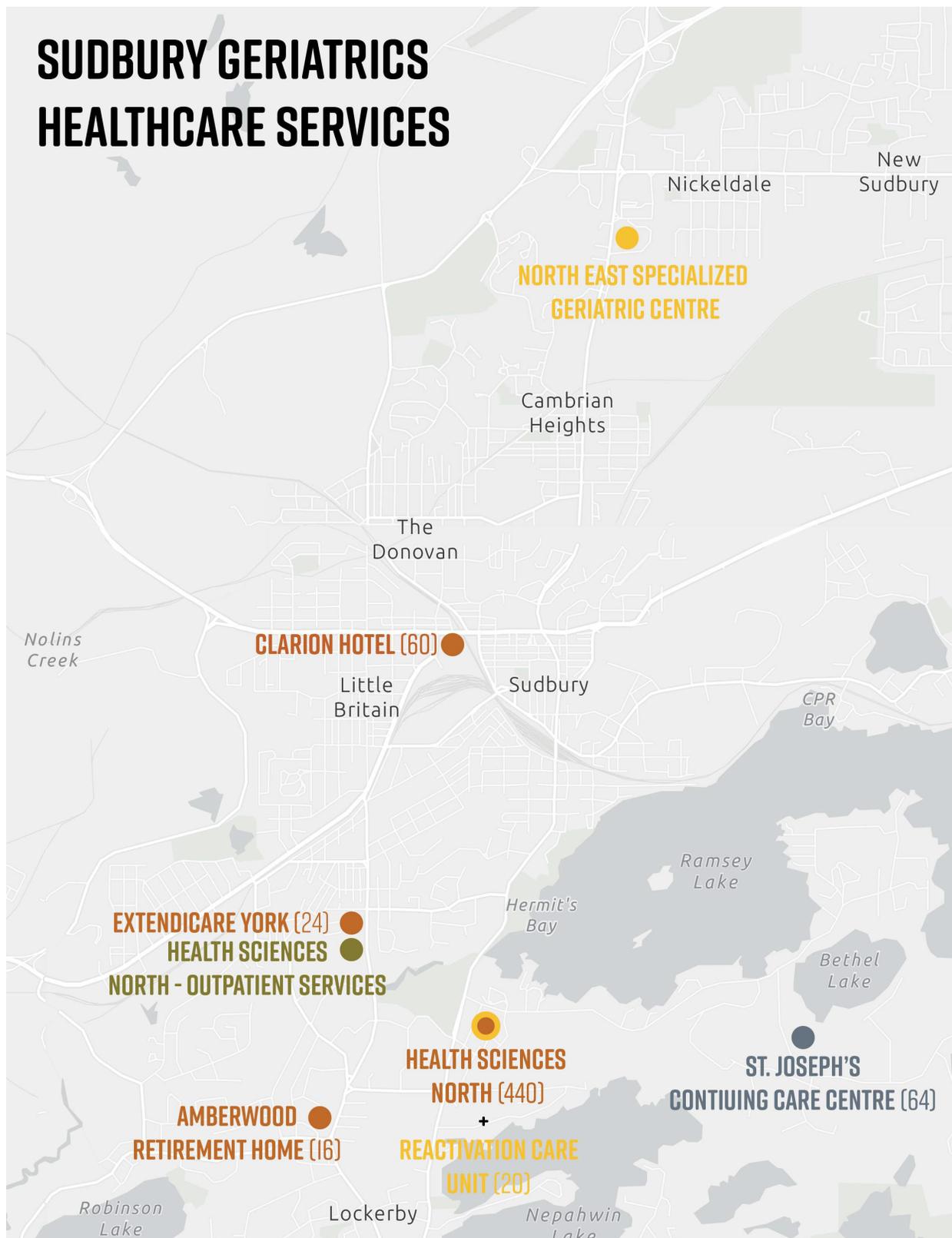
**Figure 1.9 (Right):** This is the current map of all the geriatric services across Sudbury Ontario, which are affiliated with Health Sciences North. The North East Specialized Geriatric Centre has support programs throughout the city.

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29 Chiara Catania et al., “Waiting and the Waiting Room: How Do You Experience Them?” Emotional Implications and Suggestions from Patients with Cancer’, *Journal of Cancer Education: The Official Journal of the American Association for Cancer Education* 26, no. 2 (June 2011): 388–94, <https://doi.org/10.1007/s13187-010-0057-2>.

30 ‘Value & Efficiency- Health Quality Ontario (HQO)’, accessed 22 December 2021, <https://www.hqontario.ca/System-Performance/Yearly-Reports/Measuring-Up-2019/Value-and-Efficiency>.

# SUDBURY GERIATRICS HEALTHCARE SERVICES



### 1.3.2 Sudbury's Recovery Facilities

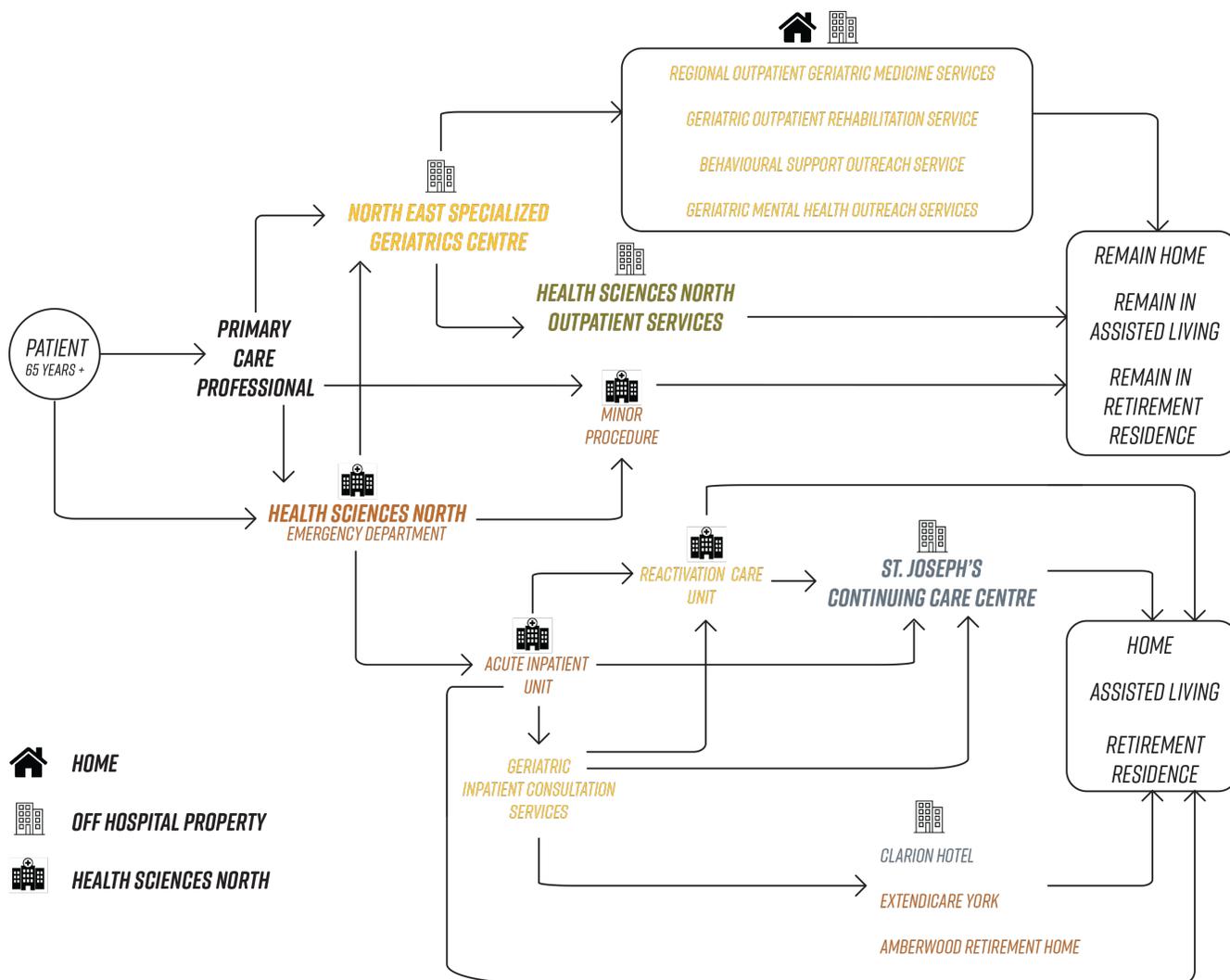
In Sudbury, the recovery facilities are wide spread throughout the city (Figure 1.9). This is due to the fact that HSN, the largest hospital in the North East Health District, is built too small. There are not enough in-patient beds to support the community, similarly to the rest of the trend across the province. In the past, HSN has been known to be overcrowded and placed patient beds in hallways and in shower rooms. Patients in Ontario tend to wait approximately 9.7 hours before an inpatient bed becomes available to them.<sup>31</sup> To alleviate some of the overcrowding, HSN has been sending patients who are no longer in intensive care to exterior facilities, where they receive rehabilitation therapy and other support programs. This includes St. Joseph's Continuing Care Centre (64 beds), the Clarion Hotel (60 beds), Extendicare York (24 beds), and Amberwood Retirement Home (16 beds). For seniors, transitioning between different facilities and programs increases unfamiliarity and creates unnecessary stress (Figure 1.10). Moving elderly patients is extremely disorienting for them especially when there is uncertainty and confusion about the treatment process.

In addition, disorientation happens in hospitals because spaces have a tendency to look similar to one another. There are rarely any differentiating factors when it comes to the design of hallways, rooms, waiting rooms, etc.<sup>32</sup> Inpatient rooms have a tendency to also be dull, medical equipment is a prominently displayed and there are noises and beeping that are constant. There are often times the use of cold colours that make the spaces seemingly more sterile than they need to be and the smell of harsh cleaning products linger in the air. This makes the entire hospital experience stressful and often times recalls bad experiences due to its distinct feel.

**Figure 1.10 (Right):** This flowchart represents all the different pathways a geriatric patient might take to receive the care they need in Sudbury.

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31 'Value & Efficiency- Health Quality Ontario (HQO)'.  
32 Parke, Friesen, and Fraser Health Authority (B.C.), *Code Plus*.



## 1.4 Risk as the Issue

One of the main reasons seniors should stay clear of these clinical environments is because of the stressors that they experience while undergoing medical treatment. Medical research indicates that stress and cognitive decline are linked.<sup>33</sup> According to David Theodore, a Canadian scholar in the realm of hospital and prison architecture:

“Sickness can make us intensely aware of our near sensate environment.”<sup>34</sup>

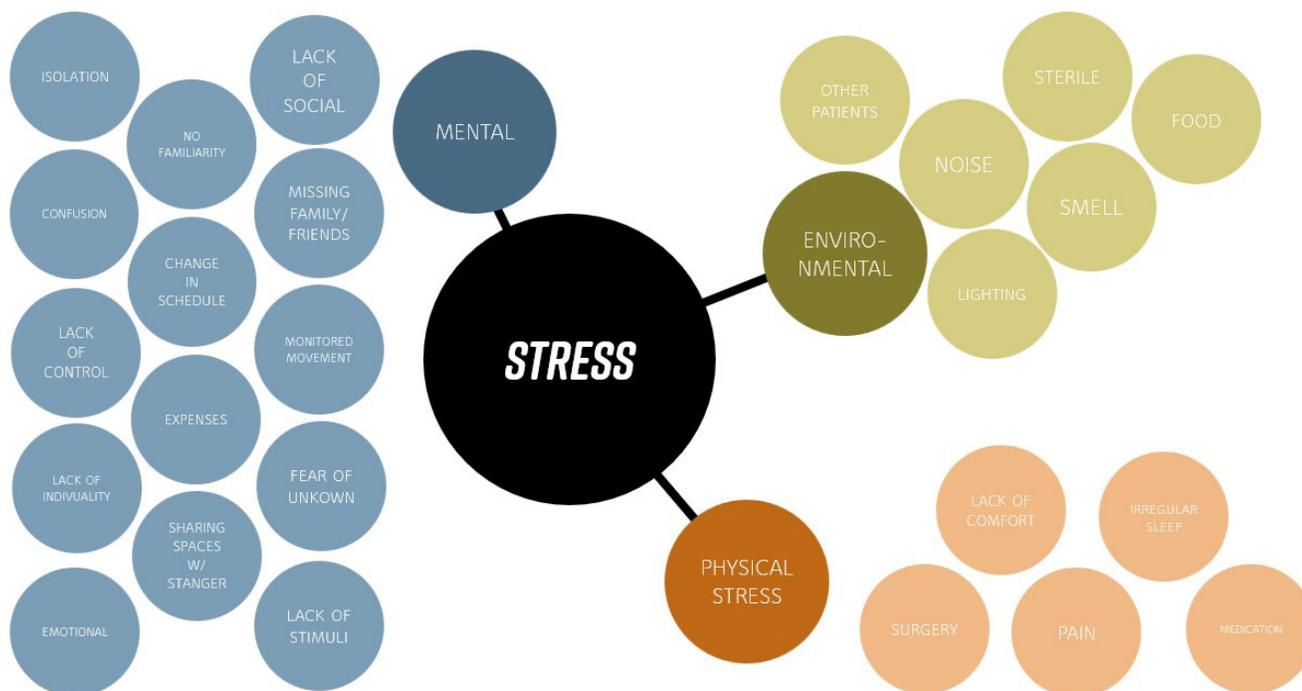
This makes complete sense since patients become so attentive to their own bodies that their focus cannot be placed elsewhere. When feeling sick or injured corporal attention is at its highest. When in this vulnerable state, the body is susceptible to feeling different types of stress (Figure 1.11). Firstly, there are the physical stressors on the body, undoubtedly pain prior to treatment, pain due to surgery which are the largest factors to consider. Also, irregular sleep patterns, the body’s physical discomfort such as uncomfortable beds or room temperature, as well as prescribed medication side effects can affect the body negatively. There are also stressors that are linked to the environment which the patient is in, such as excessive noise, strange and unfamiliar smells, sharing spaces with complete strangers, uncomfortable lighting (i.e. glares, florescent lights, or harsh lighting). These stressors are innately linked to architecture and can begin to find resolution within a design that creates a caring environment for patients. Next are stressors that are linked to the patient’s mental well-being, such as feelings of isolation, missing family members,

**Figure 1.11 (Right):** List of stressors that patients face when getting admitted to the hospital. There are three categories that stressors fall into: mental, environmental and physical stress.

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33 Mathews, Arnold, and Epperson, ‘Hospitalization and Cognitive Decline’.

34 David Theodore, ‘The Decline of the Hospital as a Healing Machine’, in *Healing Spaces, Modern Architecture, and the Body*, ed. Sarah Schrank and Didem Ekici, Ashgate Studies in Architecture Series (Abingdon, Oxon ; Routledge, 2017). 187.



confusion of their treatment process, lack of personal control, and lack of familiarity to name a few. These stressors all weigh on a person who is already experiencing difficulties. Addressing and reducing some of these stressors through an architectural medium will aid patients' overall well-being thereby preventing cognitive deterioration.

## Conclusion

Understanding patient experience makes designers more empathetic towards creating spaces that will accommodate their needs best. By researching common medical conditions and the effect of co-morbidities and delirium on patients, better design decisions can be made to assist in preventing cognitive decline.

# CHAPTER 2: HEALTH & ARCHITECTURE

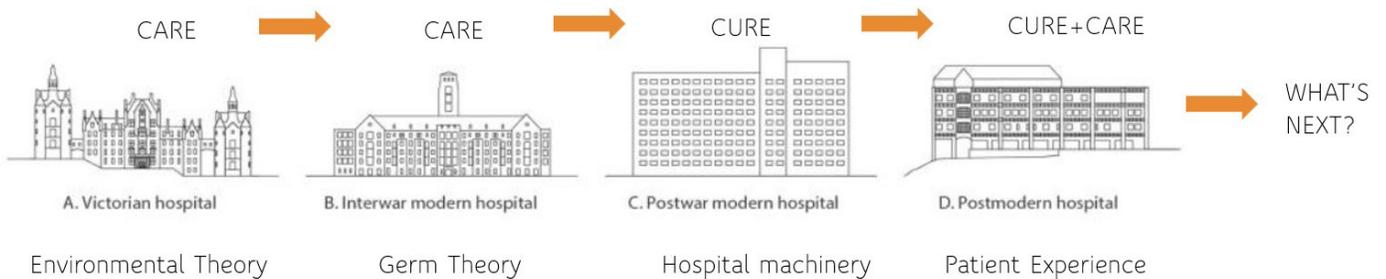
## Introduction

Hospitals are unique architectural typologies. They have an influence over the users mental and physical well-being unlike any other type of building. Over the years, the technological advancements within the building helps shape the layout, adjacencies and size of hospitals (Figure 2.1). The architect has a role to keep medical practitioners, patients and their family members happy, all the while ensuring that the building ultimately be an aid in the healing process by creating therapeutic spaces. Therefore lighting, ventilation, cleanliness/sterility and general layout are all considerations that must be taken into account. We have however forgotten some of these distinctions as hospitals have evolved. Since hospitals are public buildings, they must allow for the vast majority of people to feel comfortable, safe and secure when they walk in regardless of religion, race, age, sex, etc.<sup>35</sup> Historically, hospitals were places that were segregated not only by the previous distinctions but also by their illness. Today, hospitals are an amalgamation of different wards and floors that all have fairly distinct uses to help treat specific parts of the body, such as cardiac, pulmonary or neurology.

**Figure 2.1 (Right):** Based on a diagram made by Annemarie Adams, the superimposed “cure and care” marks the evolution of the hospital with the medical theory of the time.

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35 Adams, ‘Canadian Hospital Architecture’.



As hospitals evolved over the past century there has been more emphasis on the technological aspects that can help cure diseases that have previously been untreatable.<sup>36</sup> This of course does help the body but has rendered the mind as a forgotten aspect of health. It is with the use of innovative design strategies such as biophilia, senior friendly hospital design, and positive distractions that will help patients with their cognitive struggles while in recovery.

<sup>36</sup> Theodore, 'The Decline of the Hospital as a Healing Machine'.

## 2.1 Importance of Biophilia in Healing Environments

Over the evolution of hospital design, we seem to have forgot just how important connecting to nature can be for our mental health which in turn affects our bodies directly. There are strong ties between the theory of biophilia (which is the integration of natural elements in design that we are predisposition to) and well-being. The use of natural sunlight, views to nature, water features, access to natural air, etc. has been proven to reduce respiration rates, blood pressure, heart rate and substantially improve pain tolerance.<sup>37</sup> In David Theodore's research on the evolution of hospital design he explains this decline in connection to place and where we heal:

“Until the mid-nineteenth century, medicine and health in the West followed the teachings inherited from Galen and the Hippocratic corpus. Under this humoral framework, both body and architecture were always addressed when doctors made prescriptions about how to live a healthy life. Indeed, even the title of the most well-known text in this tradition, the late fifth-century BCE text *Airs, Waters, Places* set out a fundamental relationship between health and place. The advent of new conceptions of disease and health, however, gradually led to a disavowal of the connections between health and place, displacing the notion that the hospital environment should be therapeutic.”<sup>38</sup>

In Theodore's text, *The Decline of the Hospital as a Healing Machine*, he argues that as time went on, the idea of cure became more prominent in medicine, whereas prior to finding cures, there was only the notion of caring and trying to make someone the most comfortable as possible. Florence Nightingale's environmental theory published

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37 Richard Mazuch, 'Salutogenic and Biophilic Design as Therapeutic Approaches to Sustainable Architecture', n.d.

38 Theodore, 'The Decline of the Hospital as a Healing Machine'.



**Figure 2.2 (Upper Left):** The large windows in the waiting area along with a lightwell on the ceiling at the Paimio Sanatorium allow for natural sunlight to fill the space.



**Figure 2.3 (Upper Right):** Windows in the stairwell with space to sit on each half level allowed tuberculosis patients to take their time while climbing or descending the stairs. Common paths of travel were well illuminated with natural light during the day.

in 1859 emphasized the importance of natural elements such as sunlight and clean fresh air in patients healing spaces as a method of helping patients recover in healthier environments. This theory was wide spread among western medical practice, therefore the use of natural elements began to be embedded within the built environment.

An example of historic uses of biophilia within the hospital's built environment prior to cure is Alvar and Aino Aalto's 1932 Paimio Sanatorium in Finland (Figure 2.2, 2.3, 2.5). Since patients who were suffering from Tuberculosis had no antibiotics to cure their disease, they opted for nature to help them instead. The Aalto's, while using their functionalist design, implemented as much sunlight as they possibly could into each space in the building. All patient wing hallways were single loaded corridors with windows on the north side allowing for soft natural light to enter into these commonly used halls (Figure 2.4). They also allowed for these windows to open thus having the fresh country air flow into each patient's room. Using large balconies on each floor and on the roof created spaces where patients could soak in the sun and breath fresh air, as prescribed by medical practitioners at the time. The vast views toward the countryside aided in the ideas of relaxation and fresh air for all. In a sense, just being in the building was a form of the treatment itself.





**Figure 2.4 (Left):** Patient corridors only had rooms on the south side, thereby allowing light to enter the hallway on the north side.

**Figure 2.5 (Above):** Double height southern windows in the dining hall could be controlled with exterior shading devices so that patients' eyes could be comfortable.

An example of biophilic design in current day is Maggie's Centre in Manchester, UK (Figure 2.6, 2.7, 2.8, 2.9). The use of greenery and natural lighting is abundant in spaces that cancer patients dwell in. The creation of a greenhouse for patient use allows them to plant vegetation in the raised garden boxes that surround the building. This therapeutic activity for patients is beneficial for their mental well-being. There are many large floors to ceiling windows that allow a continuous view from indoors to outdoors letting in all of the natural light. In addition to all of these natural elements, the structure of the building is exposed wooden beams and columns that are articulated in organic and original ways, thereby creating visual interest of natural materials for patients and visitors to view.



**Figure 2.6 (Above):** Outdoor garden area at Maggie's Centre Manchester



**Figure 2.7 (Left):** Exposed wooden structure at Maggie's Centre Manchester

**Figure 2.8 (Upper Right):** Skylights allowing plenty of natural light into Maggie's Centre Manchester

**Figure 2.9 (Lower Right):** Casual seating space for socializing at Maggie's Centre Manchester



## 2.2 Geriatric Centres & Senior Friendly Hospital Design

Modern geriatrics were recorded to have really begun in England in 1935 with the research done by Marjory Warren who had taken over the “aged beds” in the West Middlesex Hospital. She enhanced patients’ environments, introduced rehabilitation programs and encouraged patients to be more physically active while they stayed in a hospital.<sup>39</sup> Her innovative ideas inspired many who came after her such as Lionel Cosin, an orthopedic surgeon in Orsett in Essex. He changed the way in which he treated elderly patients after hip surgery. His motto was “bed is bad”.<sup>40</sup> Meaning that he was aware of the risks of functional decline and to him, movement was the best way to fight against it. Similar ideologies are still in place today nearly 90 years later. In addition, recent studies prove that senior patients who recover in a geriatrics ward are more likely to return home at a quicker rate comparatively to general medical wards. (Figure 2.10)<sup>41</sup>

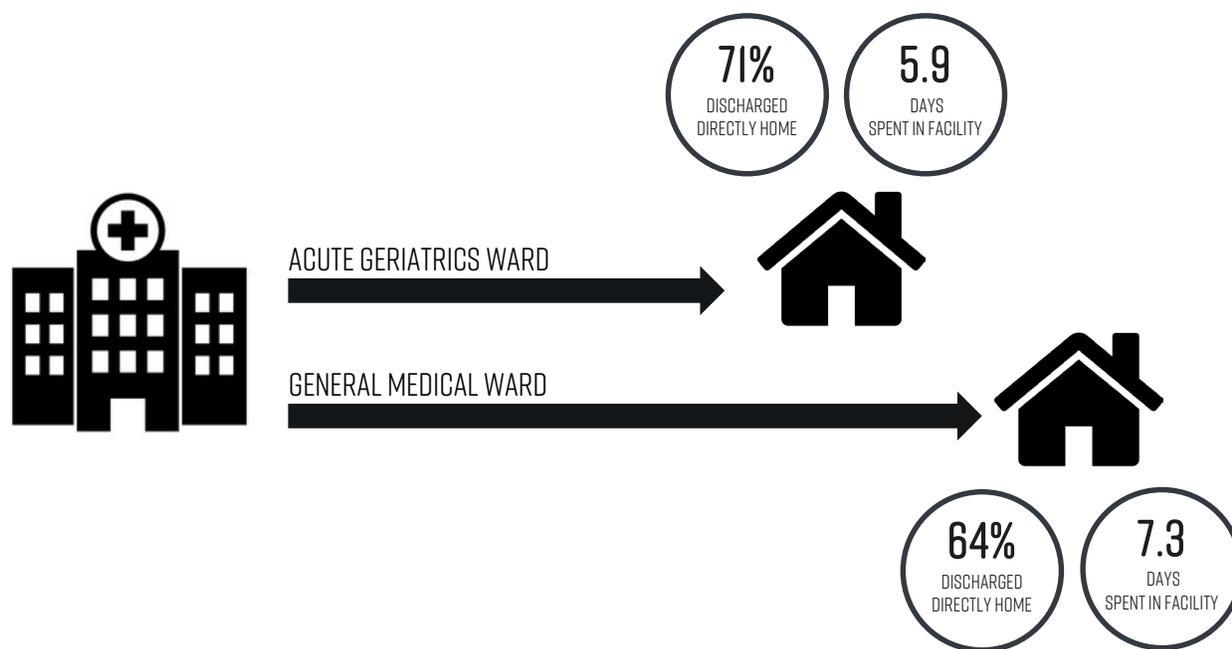
In Ontario, there are developed principles that staff follow and are trained on to create senior friendly hospitals. There are seven principles that they use to make seniors feel at ease. This includes: resilience, independence and quality of life; compassion and respect; informed and empowered older persons and families; person- and relationship- centred partnerships; safety and security; timely, equitable, and

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39 Morley, ‘A Brief History of Geriatrics’.

40 Morley.

41 K. Asplund et al., ‘Geriatric-Based versus General Wards for Older Acute Medical Patients: A Randomized Comparison of Outcomes and Use of Resources’, *Journal of the American Geriatrics Society* 48, no. 11 (2015): 1381–88, <https://doi.org/10.1111/j.1532-5415.2000.tb02626.x>; Kristin Taraldsen et al., ‘The Long-Term Effect of Being Treated in a Geriatric Ward Compared to an Orthopaedic Ward on Six Measures of Free-Living Physical Behavior 4 and 12 Months after a Hip Fracture- a Randomised Controlled Trial’, *BMC Geriatrics* 15, no. 1 (4 December 2015): 160, <https://doi.org/10.1186/s12877-015-0153-6>.



**Figure 2.10 (Above):** This diagram represents the advantages of elderly patients staying in an acute geriatric ward versus a general medical ward.

affordable care; and finally evidence informed information.<sup>42</sup> Understanding that these principles affect both patient and caregivers is extremely important. As people age, often times unpaid caregivers (such as younger family members, spouses, partners, friends, etc.) are involved in the decision making for the medical care of the patient. This is stressful on both caregivers and patients. However, by using the principles of senior friendly hospitals, it empowers seniors to feel like they do have a certain amount of power over their medical process, which ultimately makes the experience less stressful.

Understanding these principles and applying them to architectural designs of care facilities is something which can be translated into good care for seniors while providing the opportunity to help medical practitioners and family members in the promotion of their care.

<sup>42</sup> 'Senior Friendly Hospitals | Regional Geriatric Program of Toronto', 28 November 2017, <https://www.rgptoronto.ca/initiatives/senior-friendly-hospitals/>.



These senior friendly principles are also evident in Maggie's Centre in Manchester (Figure 2.11). Seniors are permitted to wander throughout the building as there are several lounging areas and a large kitchen to promote the sense of independence even though there are staff ready to assist in any way they can. The west side of the building is entirely dedicated to living space for the cancer patient residents while the east has several therapy rooms. Using the principles which the Ontario healthcare systems use, the spaces at the Maggie's Centre in Manchester can be classified with: resilience, independence and quality of life; compassion and respect; and informed and empowered older persons and families. Because of the independence seniors have at this facility, their experience is better and therefore their cognition is better off as well.

**Figure 2.11 (Above):** The kitchen is the heart of Maggie's Centre Manchester. It is here where patients gather to socialize, have a bite to eat, and feel some normalcy in throughout their cancer treatments.

## 2.3 Positive Distraction & the Familiarity of a Child

Among the elderly, the risk of dementia is considerably higher for this vulnerable population. Familiarity is important as patients with this disease tend to do better in environments that they are most familiar with. For example, studies showcase that reminiscence therapy can be helpful in the cognitive ability of dementia patients. The idea of reminiscence therapy is to bring in familiar objects or photographs which the patient can identify and explain so that they are using their memory and bringing it to the forefront of their thoughts. In a research study conducted in 2021, depression rates decreased in elders who participated in reminiscence therapy.<sup>43</sup>

Familiarity is something that is different for all people, however the majority of the population in Sudbury have had children in their lives, whether it be their own or not. Familiarity and the feeling of importance are both things that children can bring for the elderly. Elders feel as though they can share and help therefore taking the focus off of their own ailments. When a person feels they are sick, they have a hard time thinking about anything other than being sick. The inclusion of a child can be a form of positive distraction as well as create moments that are impactful as reminiscence can be reached within the interaction with a child. There are several nursing homes that have already implemented an intergenerational model that involves both children and seniors to spend time together. Having them in the same or adjacent spaces helps create a more playful and positive environment for seniors. Interestingly, there are several different kinds of activities enjoyed by both parties. Examples include, arts and crafts, puzzles, music and singing, reading books, etc. Creating these activities promotes learning opportunities for children and are great pass-times for seniors.

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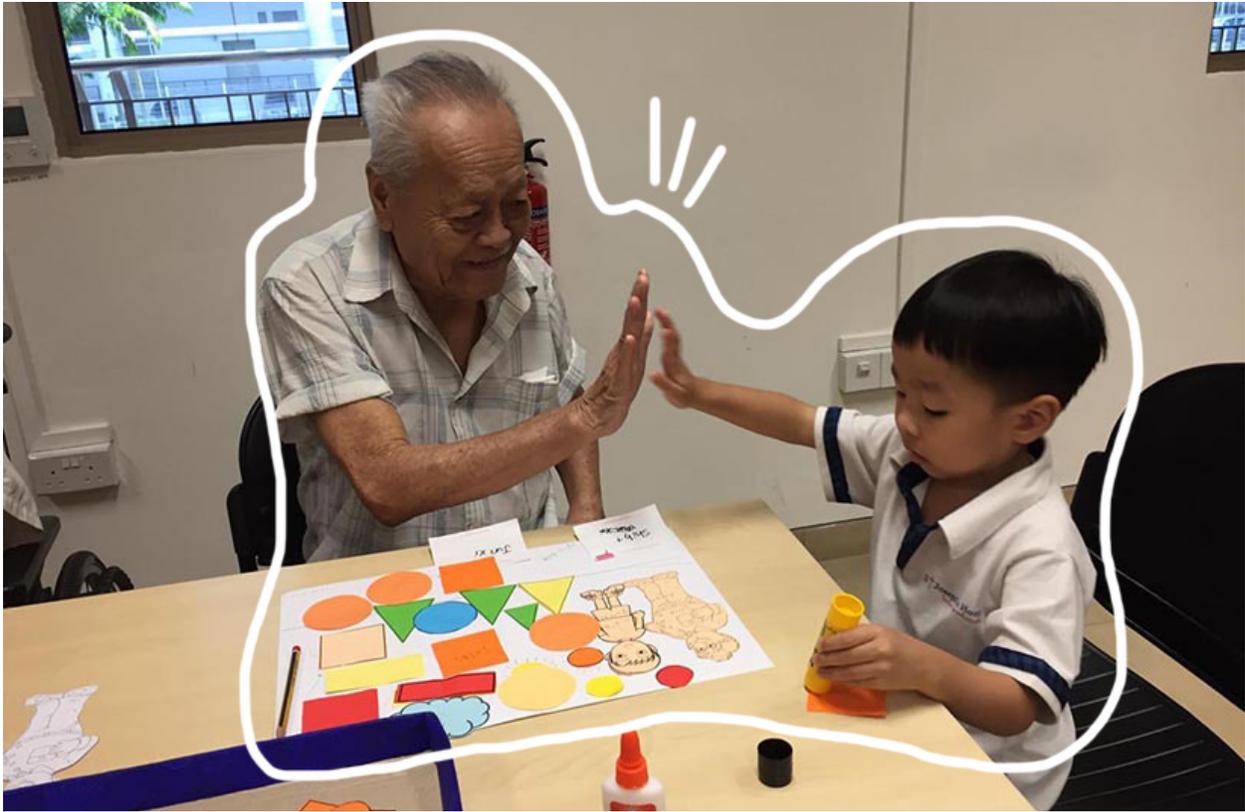
43 Zhuo Liu et al., 'The Effectiveness of Reminiscence Therapy on Alleviating Depressive Symptoms in Older Adults: A Systematic Review', *Frontiers in Psychology* 12 (2021), <https://www.frontiersin.org/article/10.3389/fpsyg.2021.709853>.



These positive distractions can alleviate stress thereby reducing cognitive decline among elders. In fact, in an intergenerational nursing home in Singapore, nurses in the home claim that seniors' appetites increase when they are engaging are activities with the children. This also leads to stronger social desires (Figure 2.12, 2.13).<sup>44</sup> Seniors read, do arts and crafts, and watch plays that the children put together. Understanding that children share similar interests to seniors can help in the fight against boredom, and cognitive decline. This also creates social cues within the elderly group to create sparks for conversation between both children and other patients, which in turn promotes activity in the brain.

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44 'Impact of Inter-Generational Programmes: Findings from St Joseph's Home', St Joseph's Home (Singapore), 12 December 2020, <https://stjh.org.sg/2020/impact-of-inter-generational-programmes-findings-from-st-josephs-home/>.



**Figure 2.12(Left):** Children at the St. Joseph's Home in Singapore are performing in front of residents at the adjoining nursing home. This allows seniors to have a visual and auditory connection with the children.

**Figure 2.13 (Above):** A child and an elderly resident are enjoying doing an arts and crafts activity together. This interaction is providing the elder with mental stimuli and the child with a one-on-one educational experience. Both parties are benefiting from this intergenerational relationship.

Another example that is more local is Kipling Acres Long Term Care in Toronto, Ontario (Figure 2.14). In this long-term care facility, children and seniors meet up in common rooms to do bi-weekly activities such as cooking, crafts, bingo, move and grove sessions, and more.<sup>45</sup> On special occasions such as Halloween and Christmas, special activities are organized to celebrate with the children. According to one of the senior rehabilitation specialists, having these activities with the children is a great way to integrate movement for participating seniors as they really respond to the kid's uplifting energy.<sup>46</sup> Lounges, where seniors in the 192-bed home may spend time in, overlook children playing in the courtyard; thereby creating visual interest and keeps a playful energy alive for seniors.<sup>47</sup> In addition to the controlled and organized programs, there is also the opportunity for spontaneous interaction as children, with direct adult supervision, are able to cross paths with seniors in shared hallways. The staff at Kipling Acres say that the experience is great for both seniors and children.

“Children learn through experience. And here they get to experience another generation they might not see at home.”<sup>48</sup>

Bringing these two generations together is a great way to stimulate both body and mind for seniors, which in turn is great for reducing boredom, depression and cognitive decline.

**Figure 2.14 (Right):** At Toronto's Kipling Acres, children and seniors come together and do planned activities like playing with a parachute and foam gym balls. This is great as it creates a playful interaction between different generations.

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45 Laurie Monsebraaten, 'Magic Abounds When Daycare, Seniors Home Share Roof', *The Toronto Star*, 9 February 2016, sec. GTA, <https://www.thestar.com/news/gta/2016/02/09/magic-abounds-when-daycare-seniors-home-share-roof.html>.

46 Ibid.

47 Ibid.

48 Ibid.



## Conclusion

In conclusion, health and architecture are successful when they support one another. Designing spaces to allow for wellness directly impacts results of user well-being. Spaces with natural elements, promotion of senior independence and use of positive distraction can all aid in the recovery of seniors who are affected by stress in healthcare institutions. Implementing these strategies and design elements will reduce the feelings of isolation, disorientation, boredom and more and create happier more inviting environments for all. Geriatric care facilities can be spaces that are playful, exciting and filled with nature, while also being respectful of patient needs. Taking steps toward new kinds of healthcare ideologies for seniors as depicted with the previously mentioned case studies can boost senior moral and create better healing environments.

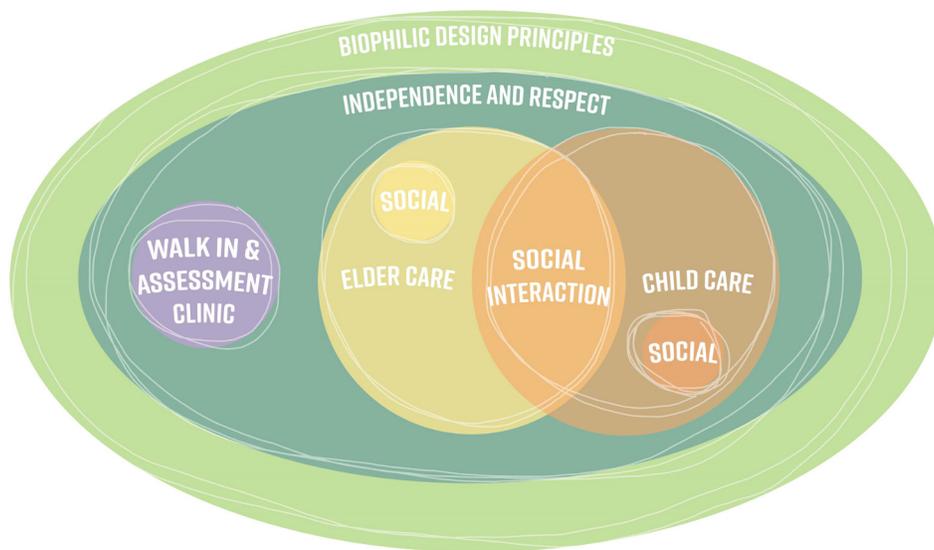
# CHAPTER 3: PROGRAM, SITE & ARCHITECTURE

## Introduction

This following chapter will be the amalgamation of all the context given in the previous two chapters as an architectural response to the main thesis question at hand. How can architecture uphold responsibility with the same gravity as the Hippocratic Oath to “do no harm” for geriatric patients’ well-being? In addition, how can architecture promote spaces for recovery while diminishing prolonged acute care side effects, ensuring that cognitive decline is reduced? Using the chapters above as pre-text, the deduction of what programmatic elements will best suit this new facility have been carefully selected to meet the current issues of the City of Greater Sudbury. However, this is not to say that this is the only region in need of better senior care. As previously stated, the senior population is on the rise in Canada, therefore demands for excellent methods of care will only increase in the decades to come.

The architectural design implemented for this thesis will consist of a geriatric assessment clinic, a geriatric healing centre, and an accompanying childcare facility (Figure 3.1). In Sudbury, the site for this thesis project, there are currently several issues that need to be addressed and can be resolved with the use of these programs. Firstly, the overcrowding at Health Sciences North is something that must be addressed

**Figure 3.1 (Right):** This diagram showcases the programmatic elements to be included in this thesis project. All programs will have elements of biophilia, and will encourage and foster independence and respect. Within that will be the programs, and social spaces will be created to encourage spontaneous interactions.



in order to reduce the wait times and give patients who no longer need critical care a place to go. Secondly, the sprawl of different senior healthcare locations across the city, currently makes medical support a confusing process for seniors. Thirdly, the lack of beds at HSN, due to the rising senior population in the city, must also be resolved. While finding solutions for these three main issues, the proposed facility will be designed with a less institutional feel to reduce stress thus reducing cognitive decline as well.

### 3.1 Geriatric Assessment Clinic

The Geriatric Assessment Clinic is the first program to be discussed. As previously mentioned, often times seniors are unable to book an appointment with their family physician in a timely fashion, therefore they revert to using the emergency department, whether it be for a true emergency or just to see a physician relatively quickly.<sup>49</sup> Currently only 30% of Ontarians who visit the emergency department actually get admitted into the hospital.<sup>50</sup> The other 70% are referred elsewhere or treated on site. With the creation of the Geriatric Assessment Clinic, patients who visit this facility will have quicker care, bypass the emergency department, and have specialized staff on hand with knowledge in geriatric medicine. Medical practitioners in this facility will include geriatricians, geriatric nurses, geriatric assessors and other supporting staff. Their role will be assessing patients who come into the facility and either treat them on the spot, create referrals to other specialized HSN programs or refer them to be admitted into an acute care department within the main hospital. Creating a safe space where seniors can go will help alleviate some of the pressures that the main hospital has in the emergency department. Thus easing the flow of patients who do not necessarily need an emergency assessment but rather just a check in with a doctor.

Currently, patients who need to be admitted to the hospital often times do not get a room or bed for hours. The provincial average is approximately 9.7 hours from the time that the decision to admit them is made.<sup>51</sup> This wait time does not include the time spent for the initial emergency department assessment which is on average 1.9 hours.<sup>52</sup> This means that patients are often times left waiting in a succession of waiting rooms or in corridors as incoming

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49 'The State of Seniors Health Care in Canada'.

50 'Emergency Department Time Spent by Patients in Ontario – Health Quality Ontario (HQQO)'.

51 Ibid

52 Ibid

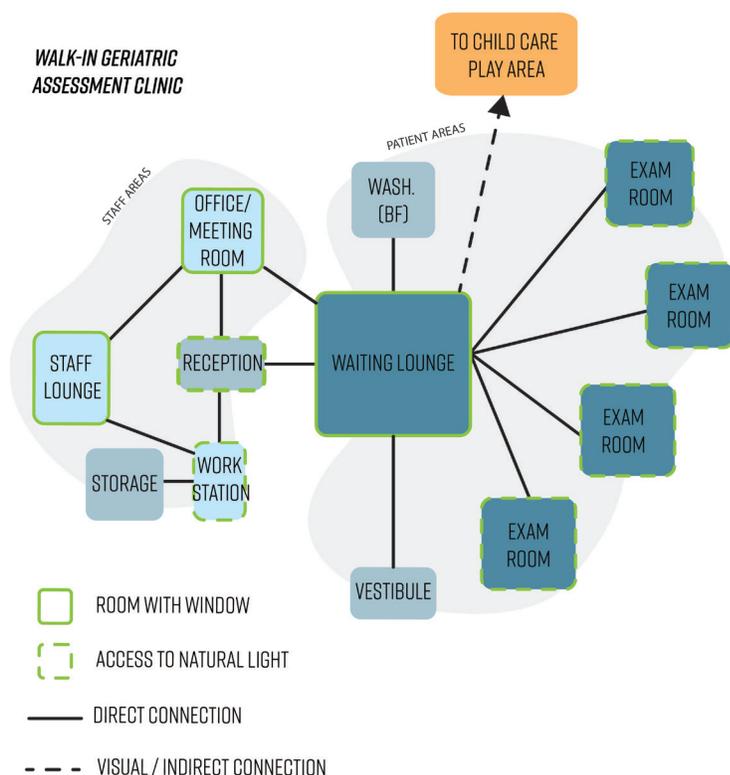


**Figure 3.2 (Above):** In Ontario and more specifically in Sudbury, overcrowding in hospitals is common. Patients who are waiting for a room have been known to receive care in hallways as they wait for a room to open up.

patients must wait for a bed to become available (Figure 3.2). For the patients' mental well-being, this is not ideal. Delirium in elderly patients, as previously discussed, often times occurs prior to, or upon initial assessment due to stress.<sup>53</sup>

This new assessment clinic will of course have a waiting area. However, this can be unconventional by including activities for seniors to partake in while they wait thus making it seem as though waiting is not as long or even making the wait enjoyable. The waiting room can be very comfortable and homelike with natural colours and relaxing therapeutic elements to help calm a patient before they get assessed by a physician. After patients have been assessed and deemed in need of admission, they may wait at the new facility before they get sent to the main hospital after a bed opens up for them. This will reduce the amount of people waiting in unconventional spaces within HSN.

53 Alasdair M. J. MacLulich et al., 'Unravelling the Pathophysiology of Delirium: A Focus on the Role of Aberrant Stress Responses', *Journal of Psychosomatic Research* 65, no. 3 (1 September 2008): 229–38, <https://doi.org/10.1016/j.jpsychores.2008.05.019>.



In the Geriatric Assessment Clinic, as a method to reduce the feelings of stress prior to seeing a medical professional, the objective is to create large windows allowing patients in the waiting room access to a nice and calming view as well as introduce as much natural light into that space as possible. These windows may also look upon the children’s outdoor play area as a way to stimulate the minds of those waiting to be seen. In addition, the inclusion of windows in the assessment rooms are important as well to reduce the feelings of claustrophobia and disorientation, all the while making the patient feel like they are in a space of privacy. See Figure 3.3 to see all the rooms that will be included in the walk-in Geriatric Assessment Clinic.

**Figure 3.3 (Above):** Relationship diagram for all the rooms found in the walk-in assessment clinic.

## 3.2 Healing Centre

As mentioned previously, patients in Ontario tend to wait approximately 9.7 hours for a bed after the decision for them to be admitted is taken.<sup>54</sup> This wait time is slow because patients are waiting for a bed to free up within acute or intensive care wards. There is a need for a transitional space post acute care for those unable to return home immediately, allowing beds to open up in a timelier fashion for new patients. In an Ontario *Value and Efficacy* report, on patient time spent in the hospital and the emergency room, they state:

“[...] little was done to improve capacity in other parts of the health system to better enable the flow of patients out of hospitals, and improvements in emergency wait times have slowed”<sup>55</sup>

The introduction of a healing facility for geriatric patients to be transferred to after they no longer need acute care from HSN, will help patients flow out of the hospital, thus allowing new patients to be admitted to HSN.

In Sudbury, HSN displaces patients throughout the entire city to admit new people into inpatient wards. The current lack of infrastructure and staff makes patients in continued care dependent on facilities off the HSN campus. Presently, HSN is developing what they call their Reactivation Centre. The focus of the program is to create a healing environment for elderly patients who have demonstrated restorative potential.<sup>56</sup> This new ward is supported by the North East Specialized Geriatric Centre. There are currently 20 beds available for this vulnerable population. However, this will not be enough to support the community’s needs.

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54 ‘Emergency Department Time Spent by Patients in Ontario – Health Quality Ontario (HQO)’.

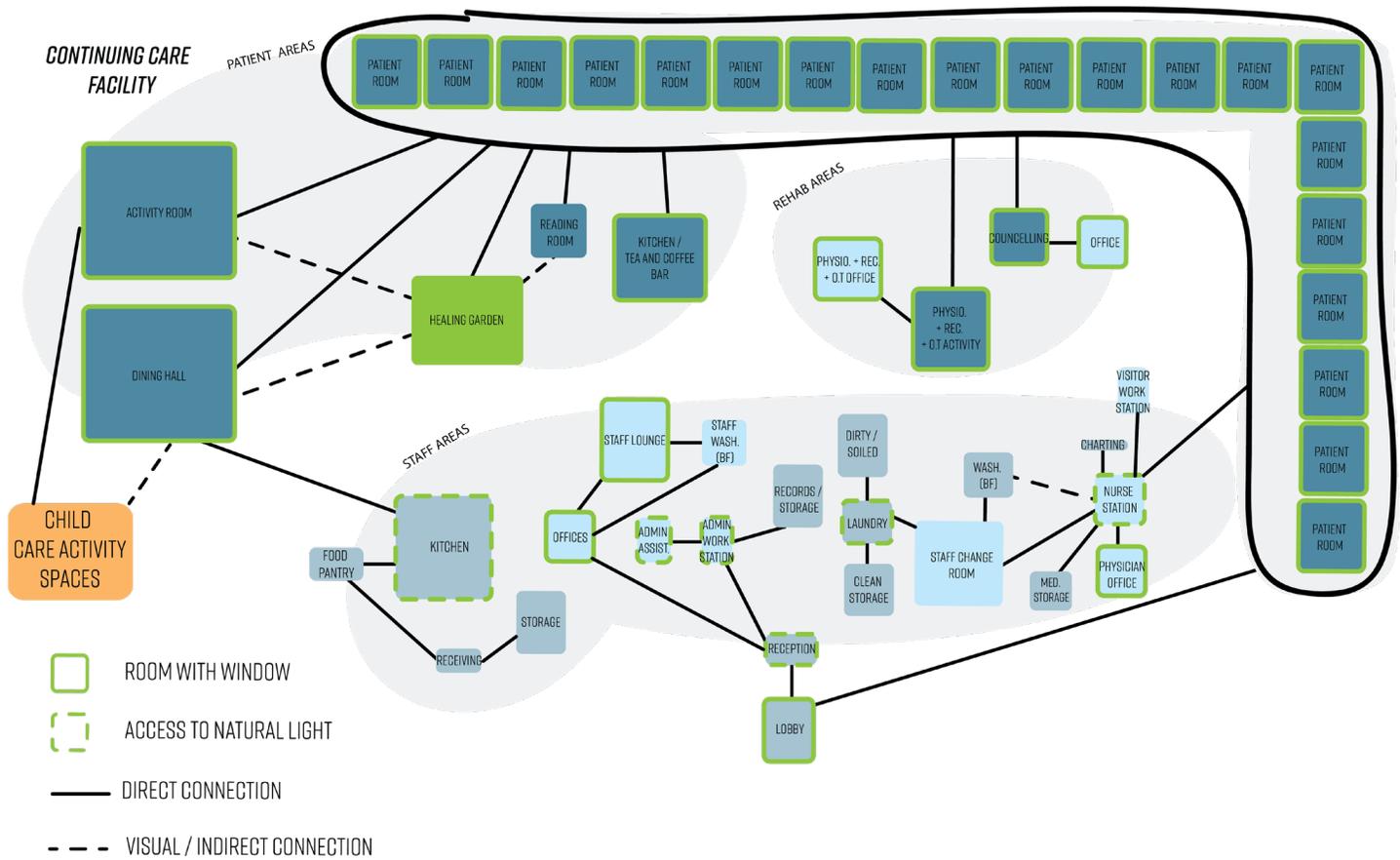
55 ‘Value & Efficiency- Health Quality Ontario (HQO)’.

56 ‘North East Specialized Geriatric Centre (Sudbury, Ontario)’, accessed 8 November 2021, <https://www.nesgc.ca/>.

According to a 2015 report by the Organization for Economic Co-operation and Development (OECD), Ontario provides 2.3 beds per 1,000 people in the province while the average for the 30 participating countries is at 4.8 beds per 1,000 people.<sup>57</sup> Meaning that Sudbury's average, according to the OECD, should be approximately 791 beds, compared to its current 604 beds throughout the city. Taking that average and applying it to seniors in the city would mean that there should be at least roughly 145 beds dedicated to seniors within the healthcare system. Since the senior population is on the rise, there should be the anticipation of creating more beds in the future. Knowing this is important in determining how many beds should be provided in this new healing facility. Having said this, creating 145 beds in one facility renders the project too big to make this a successful place for healing as patients begin to feel like a number in the system instead of individuals. Architecturally, in order to separate the experience of an institution from a healthcare facility, scale plays an important role. Which is why patient beds in the proposed healing centre will be kept relatively low. The aim is to have approximately 20 beds to create a feeling of community between patients. Each patient room will have the addition of an extra bed so that loved ones may also spend time at the facility, thereby creating a maximum occupancy of 40 people in the residents' quarters.

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57 'Chart-OECD-Hospital-Beds-Per-1000-Population.Pdf', accessed 22 December 2021, <http://www.ontariohealthcoalition.ca/wp-content/uploads/chart-OECD-Hospital-Beds-Per-1000-Population.pdf>.



**Figure 3.4 (Above):** Relationship diagram for the Geriatric Healing Facility.

While patients are spending time at this healing centre, they will also be receiving different forms of treatments that include, physiotherapy, occupational therapy, oxygen therapy, diabetes education, counselling/psychiatry and dietician services. These rooms can all be seen in the relationship diagram (Figure 3.4). Although these types of treatments are important for the recovery of patients, they will be encouraged to socialize with others in the facility thereby keeping their mental well-being at the forefront of their recovery process. Spontaneous and planned interactions between the seniors and children at the Childcare Centre will also create moments of joy for patients as well.

### 3.3 Childcare Facility and Intergenerational Relationships

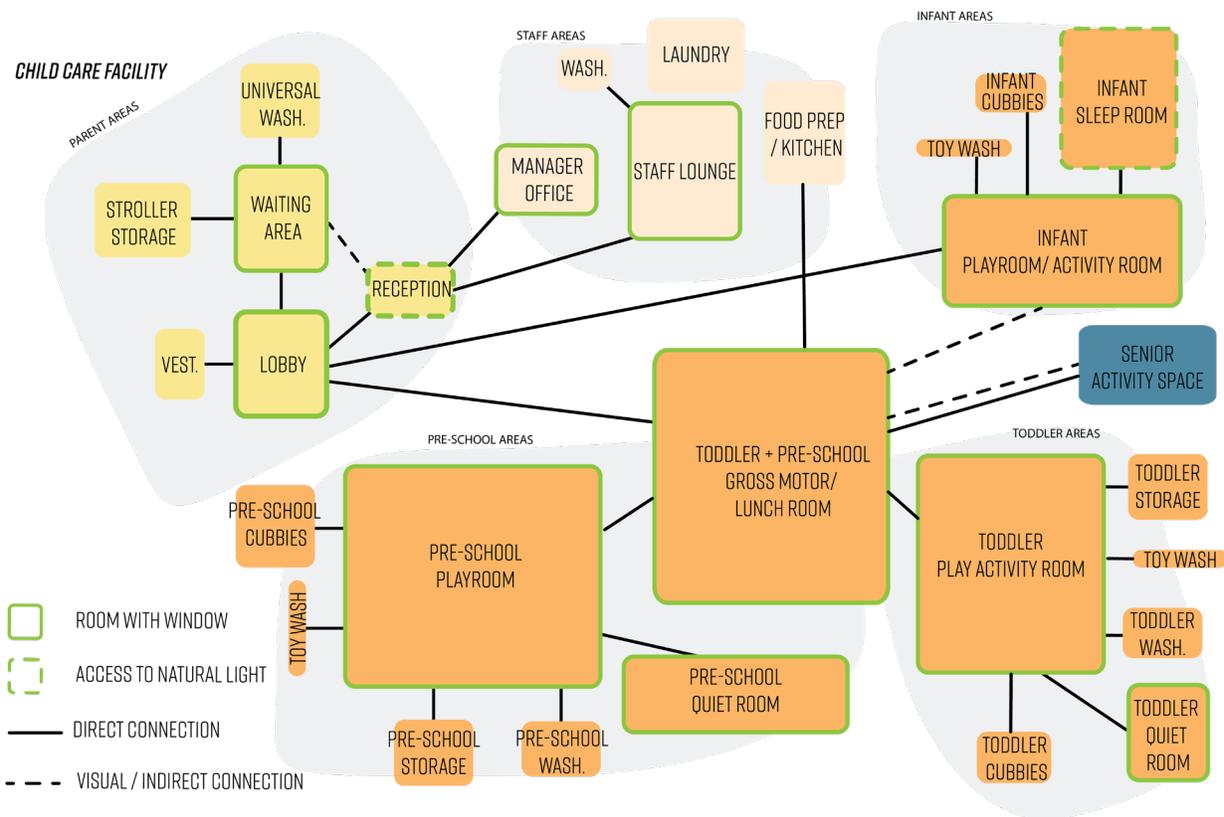
The implementation of positive distraction in spaces for healing is extremely important. In hospital environments, patients can often times rent a television to help pass the time. However, television is not a great form of positive distraction as it does not create social interactions, does not encourage patients to move or use any cognitive ability. Therefore, cognitive and functional decline are both very susceptible to patients as there is not much else to do while waiting for their bodies to recover. The implementation of social activities is extremely useful to combat boredom and create motivation for movement.

The integration of a daycare facility adjacent to the healing centre will provide patients with much needed distraction. As previously stated, children are a great way for senior's to be cognitively stimulated. Having a common space for seniors and children to meet in will be an essential part of the design. Activities in this location will include reading, arts and crafts, sharing meals and play (Figure 3.5).

This daycare will be provided for hospital staff children. Many hospital employees have schedules that differ from those of their children. Having a place to bring them when needed will be of great convenience for working parents. Some hospitals do provide daycare for children but unfortunately HSN does not. This would be a great addition as a programmatic element to encourage potential staff to practice healthcare in the north. Having an intergenerational daycare facility for children is also advantageous for kids as they learn emotional and social competencies.<sup>58</sup> They are exposed to different kinds of people with different kinds of ailments which helps them with the notion of empathy.

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58 Tiffany R. Jansen, 'When Preschool Is in a Nursing Home', The Atlantic, 20 January 2016, <https://www.theatlantic.com/education/archive/2016/01/the-preschool-inside-a-nursing-home/424827/>.



**Figure 3.5 (Above):** Relationship diagram for the Childcare Facility.

This Childcare Centre will be following the Reggio Emilia philosophy. In summary, this type of childcare’s core values is that classroom environments act as third teachers, children are encouraged to construct their own learning, and children learn to be a part of the larger community comparatively to working/playing independently. This, paired with having a connection to the outdoors, and to seniors within the facility, are influential over the children in the daycare.

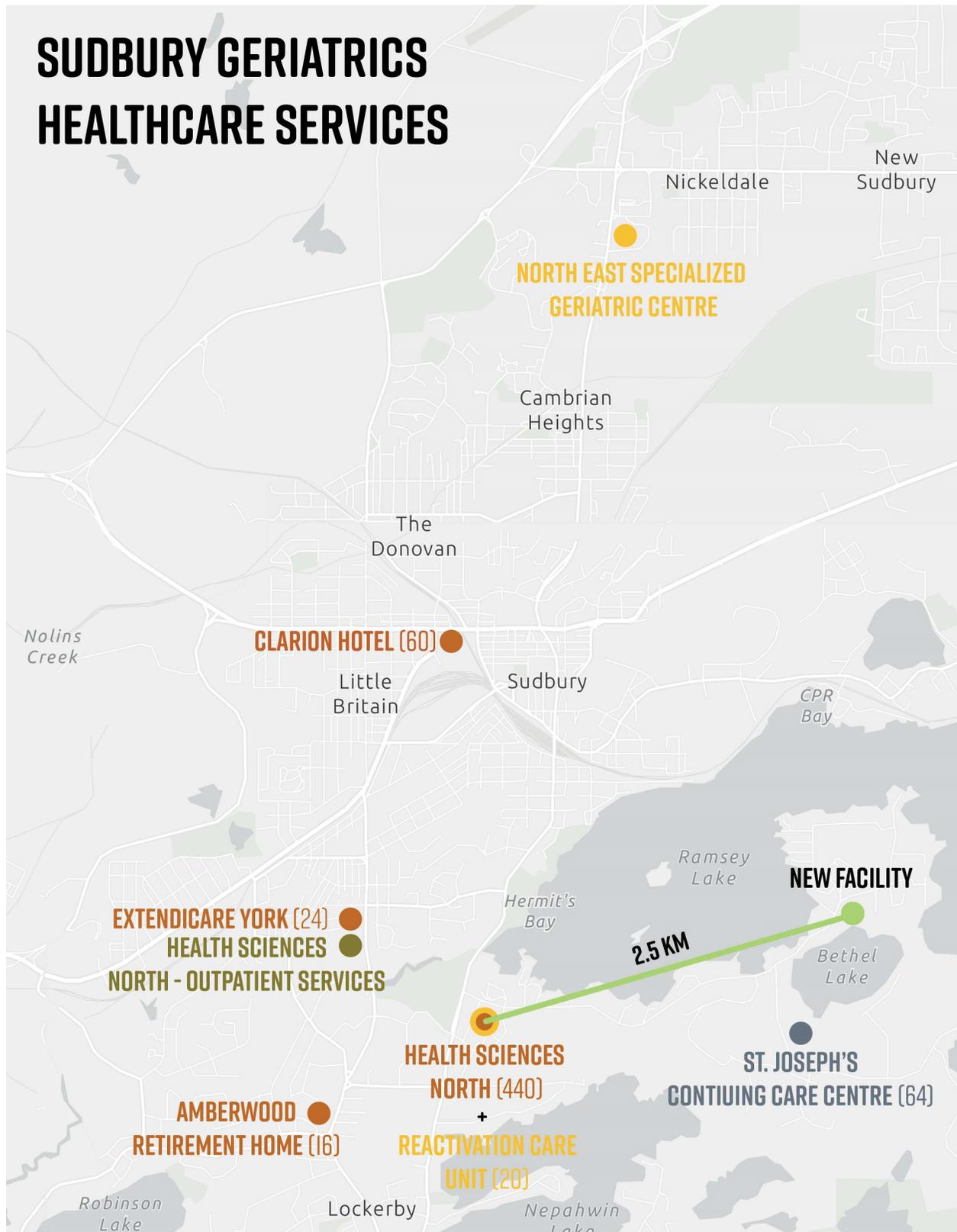
The daycare will be broken into three age groups. Firstly, an infant room (4-18 months) with five spots available, secondly, a toddler area (18-30 months) with ten spots available, and lastly a pre-school area (30 months – 5 years) with fifteen spots available. The age groups will have their own spaces for quieter play, nap times and eating, however there will be a larger space where they can engage jointly in gross motor activities, as learning from other age groups is important for their development.

### 3.4 Site Analysis

Seeing that the new Integrative Geriatric Centre will be dependent on the acute inpatient medical wards at the hospital, it is important that it be in proximity. Transporting patients to and from the hospital is not ideal for patients nor staff. Luckily, the current site of Health Sciences North is located in a beautiful part of the city. Important qualities that the site should include are: proximity to a body of water, adjacency to the hospital, low traffic, and spaces for exterior activities for both seniors and children. It is imperative that the site be ideal for these two main users. Having that proximity to natural elements will create positivity for all those using the building including staff. There are several lakes that surround HSN, most significantly Ramsey Lake and Bethel Lake. Ramsey Lake, the largest lake completely surrounded by the city of Sudbury is densely packed with residential, public land, and institutions, therefore the allotted space on the lake is not there to support a medium sized facility such as the one suggested. Bethel Lake however, is a smaller quieter lake only 2.5km away from HSN, and makes it a nice place for a lakefront property (Figure 3.6). It's a quiet area as the majority of the adjacent property is zoned as residential and park land, with the exception of Kirkwood Place, a mental health facility of the North Bay Regional Health Centre. Maison McCulloch Hospice, St. Joseph's Villa, and St. Joseph's Continuing Care Centre are all within view of the site but are located on the west shore of Bethel Lake.

**Figure 3.6 (Right):** Location of the new Integrative Geriatric Centre in relation to the other geriatric healthcare services found in Sudbury.

# SUDBURY GERIATRICS HEALTHCARE SERVICES



The site chosen for this project is a large 13.5-acre lot that sits to the south of Ramsey Lake Road and Kirkwood drive intersection (Figure 3.8). The south side of the site is lakefront property allowing for southern sun exposure. To the east is a quiet residential neighborhood as well as a network of walking trails that are part of the Rainbow Routes Association. Standing on the site and looking across Bethel Lake, there is the view of the small mountain range as well as Laurentian University (Figure 3.7). Furthermore, it provides views and sightlines across the water. Lakes provides views to animal activity, human activity, and natural occurrences such as waves, weather and reflections of light. Bodies of water create interest for those looking upon it. It is a very peaceful and beautiful location filled with nature and expansive views (Figure 3.9).



**I. VIEW TOWARD LAURENTIAN UNIVERSITY MAIN CAMPUS**

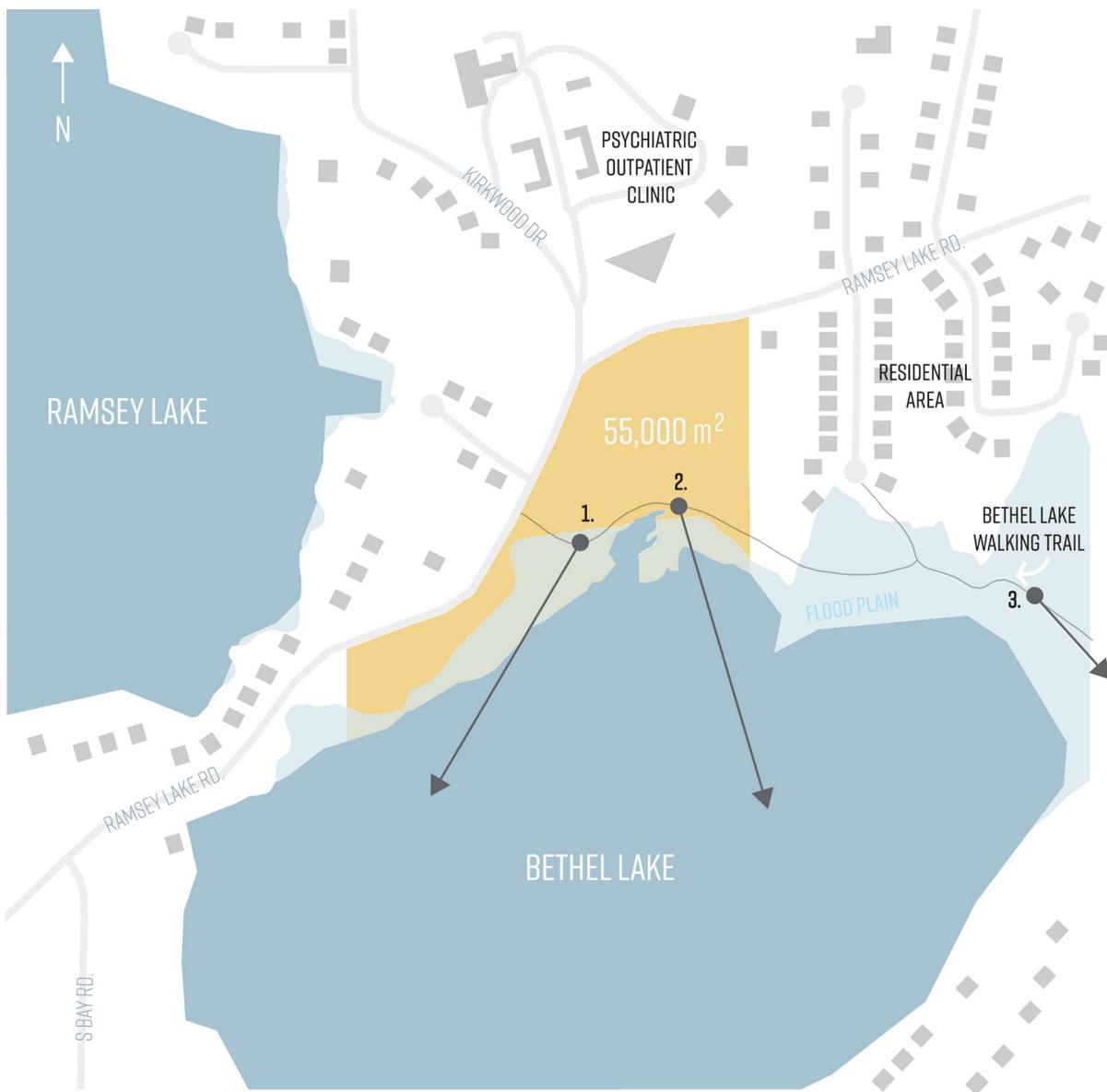


**2. VIEW ACROSS BETHEL LAKE**



**3. BETHEL LAKE WALKING TRAIL**

**Figure 3.7 (Above):** Photographs showcasing the views around the site.



**Figure 3.8 (Above):** Site in relation to the lake, the roads and the surrounding area.



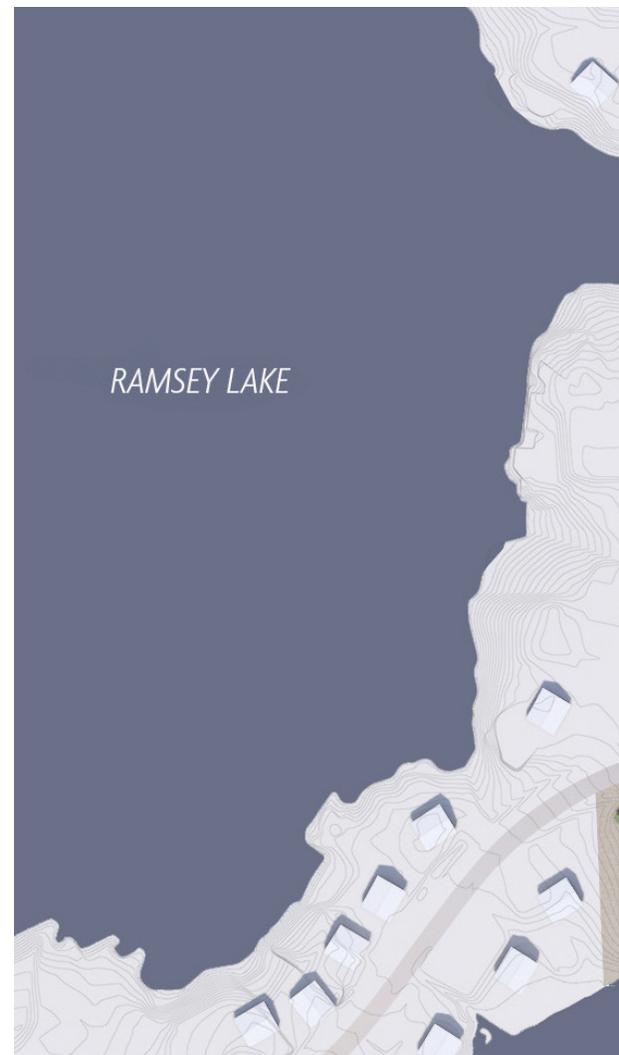
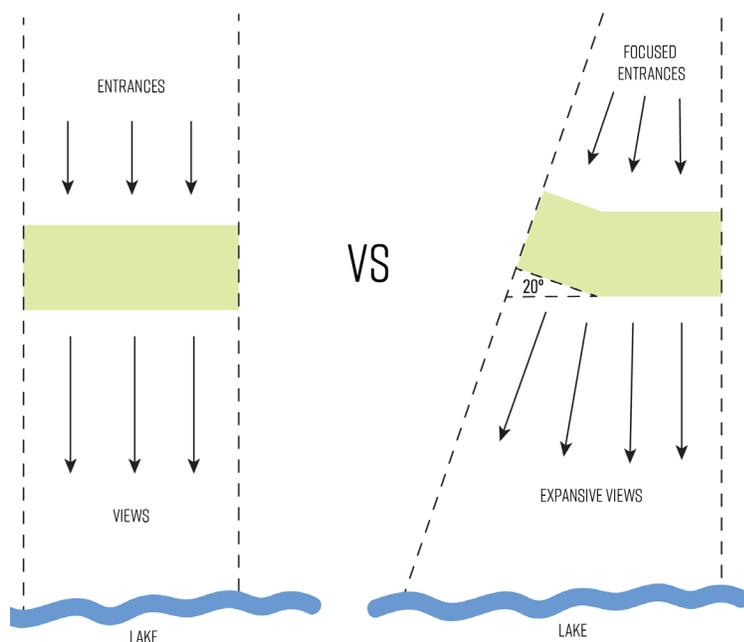
**Figure 3.9 (Above):** Panoramic photograph looking across Bethel Lake showcasing the site's beauty and the views from the patient rooms.



### 3.5 Integrative Geriatric Centre

The architectural process began with understanding what kinds of spaces would be necessary for a clinic, a Healing Centre and a daycare. The process began by referencing the Community Space Planning Guide for Health Care Facilities provided by the Ministry of Health and Long-Term Care and implementing spaces deemed necessary for such facilities.<sup>59</sup> For the daycare, a request for proposal was consulted as required spaces had been listed with their room size requirements. In addition to the necessary spaces, the inclusion of supportive spaces to reduce the feeling of the clinical sterile environment were considered. Beginning to incorporate rooms typically found in a person's home was key to echo feelings of comfort and ease. Rooms such as the kitchen, living room, dining room and reading room were all added to the list of spaces that needed to be included. Locating the building on the site was important as a way to ensure that natural sunlight and the best views could be seen. (Figure 3.10). Having a long facade on the south side was crucial to allow for maximum southern sun exposure, but also for the best views (Figure 3.11 and Figure 3.13).

59 Ministry of Health and Long-Term Care, 'Space Planning Guide for Community Health Care Facilities' (Government of Ontario, December 2014).



**Figure 3.10 (Above):** Context plan identifying the building orientation and location on site.

**Figure 3.11 (Left):** The addition of a 20 degree angle in the building helped with accessing certain views, but also created a more welcoming feeling on the north side where the main entrances are located

**Figure 3.12 (Right):** Pictogram of active and passive interactions.

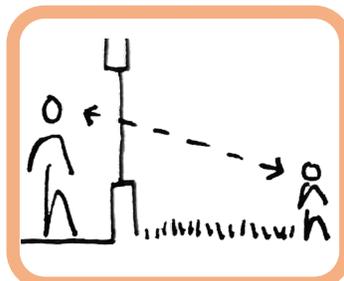


BETHEL LAKE

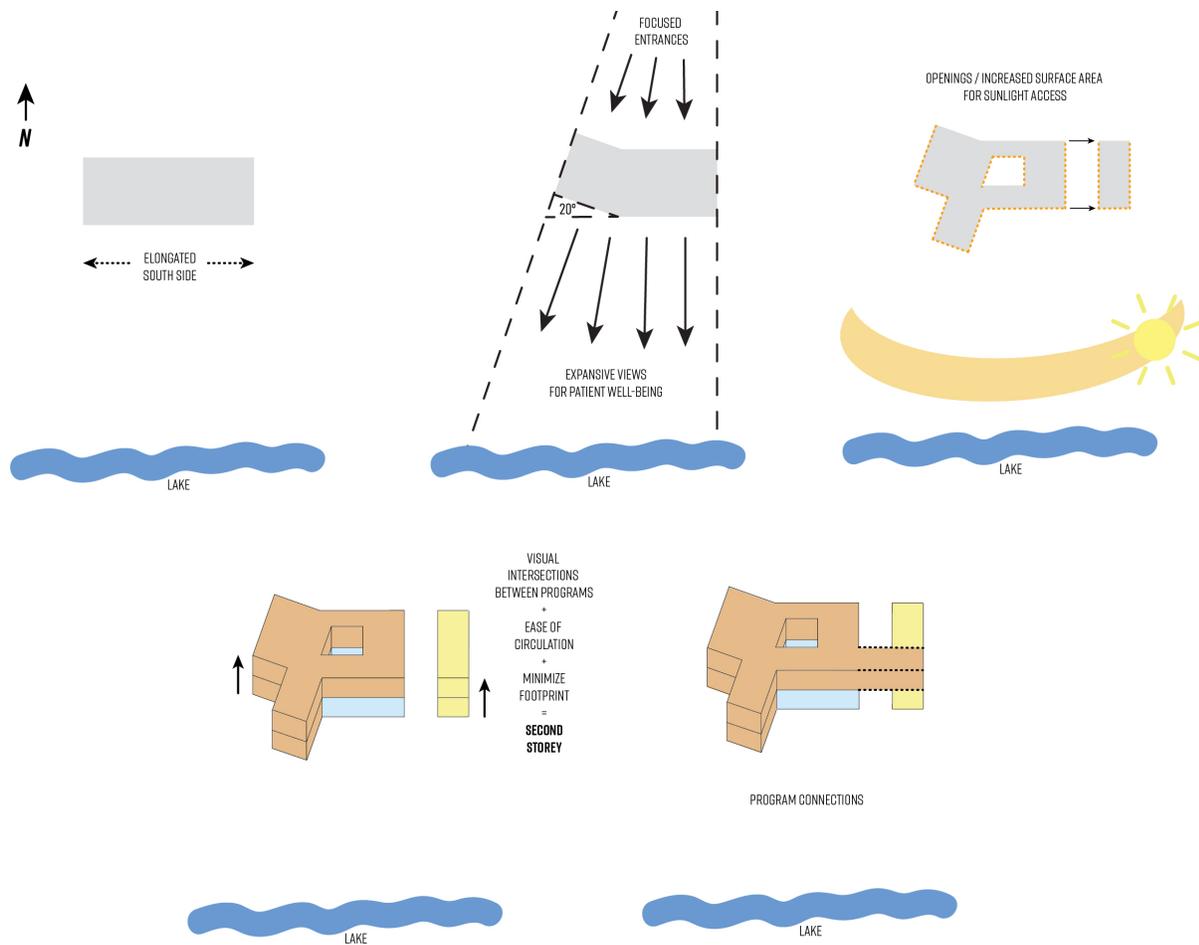
## ACTIVE INTERACTION



## PASSIVE INTERACTION

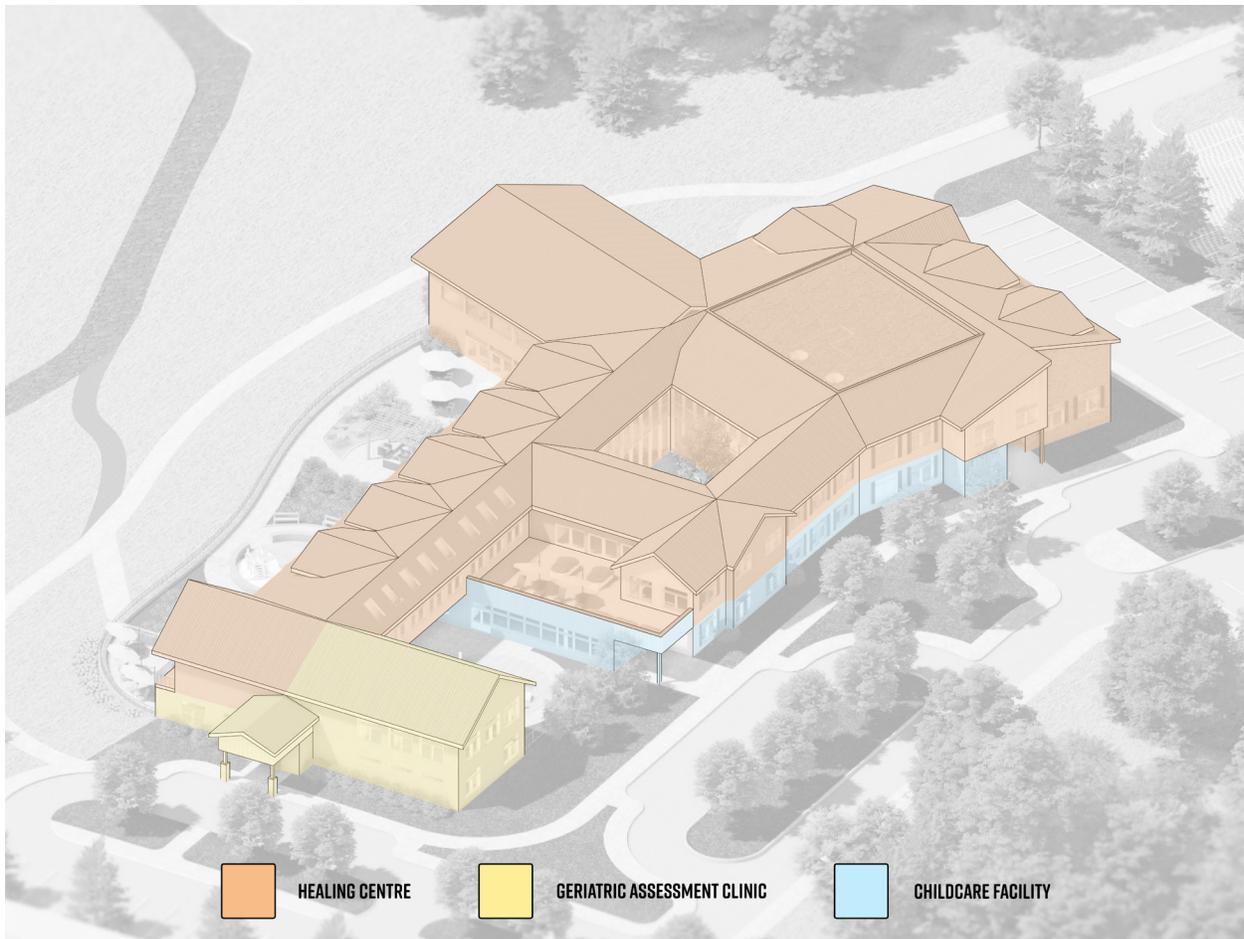


The creation of two levels, not only reduced the building's footprint, but also allows a variety of passive and active interactions between seniors and children. These moments can vary architecturally from same or different storeys (Figure 3.12) Passive interactions include visual connections and auditory connections, whereas active interactions include activities such as playing, telling stories, painting or dancing together. The childcare facility is found on the first floor whereas the Healing Centre is mostly found on the second floor to provide privacy and view vantage points for patients. The Geriatric Assessment Clinic and Rehab facility are found further away due to the frequency of people entering and exiting. In addition, passive interactions between the clinic and childcare facility were important as well.



### 3.5.1 Program

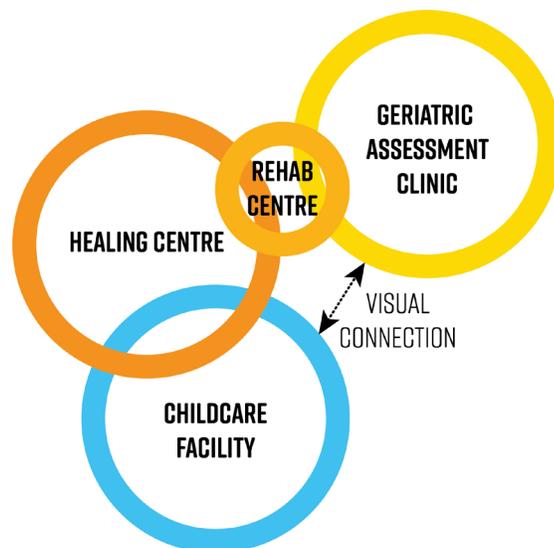
Although the project has three separate programs, they are all housed under one roof to encourage spontaneous interactions between building users. (Figure 3.14). The three different programs' needs for adjacencies differ in both physical connection to one another as well as their visual connections. The Assessment Clinic requires views toward the childcare centre as a way to create positive distractions for people in the waiting room. A physical connection is required between the childcare facility and the Healing Centre to create intergenerational interactions between the elders and the youth. The need for the Geriatric Clinic to physically touch the rehabilitation centre is mirrored by the need for the Healing Centre to do the same, therefore the Rehabilitation centre becomes the middle ground between these two programs. (Figure 3.15)

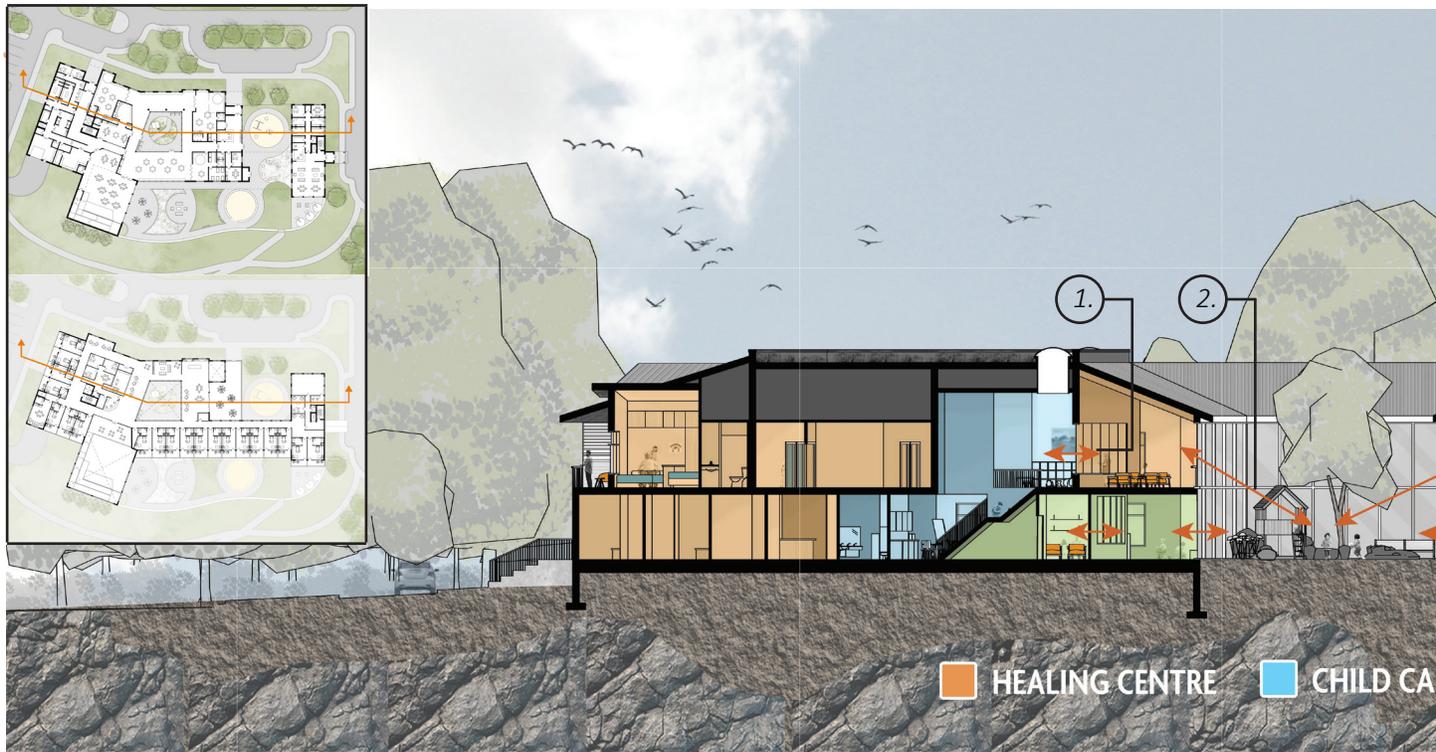


**Figure 3.13 (Upper Left):** Diagrams showing the evolution of the building's shape through design decisions.

**Figure 3.14 (Above):** Axonometric program diagram.

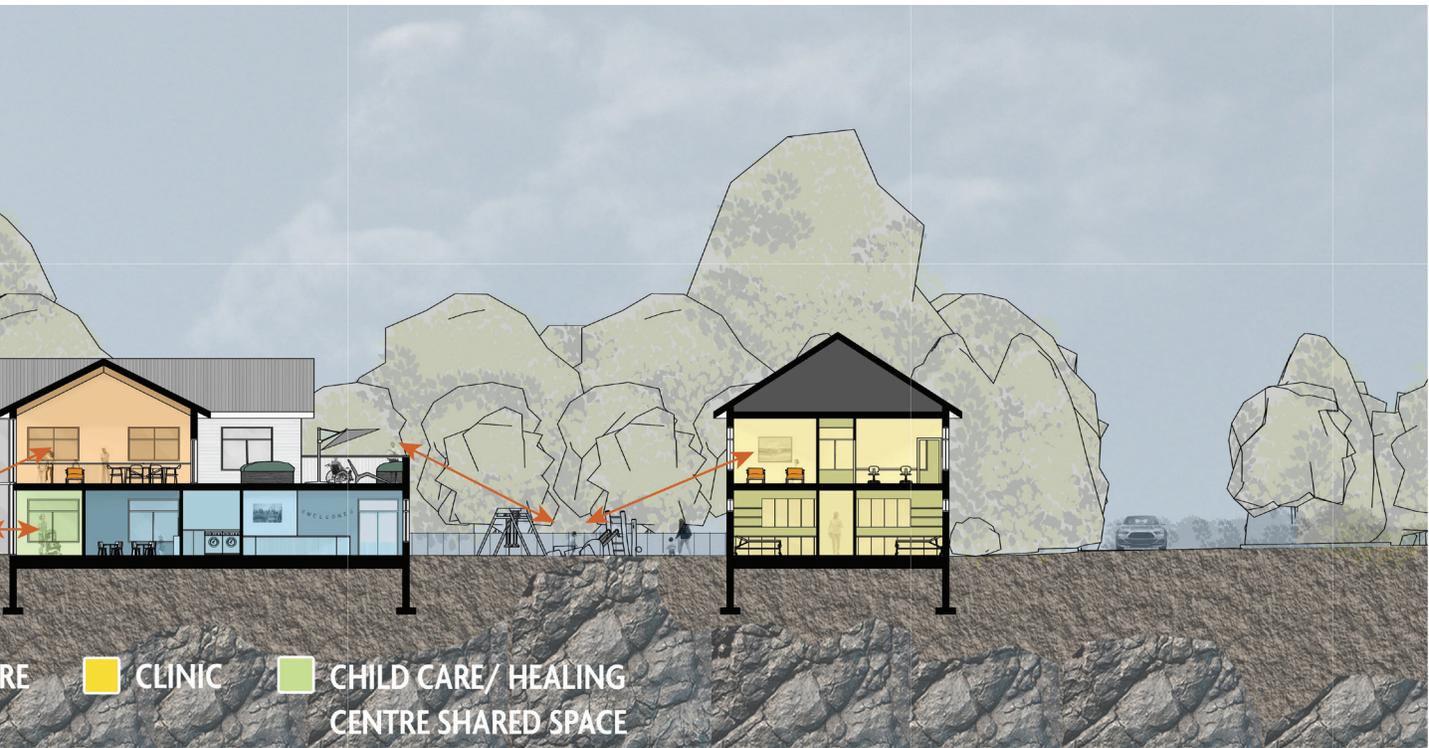
**Figure 3.15 (Right):** Adjacency diagram for visual and physical connections.





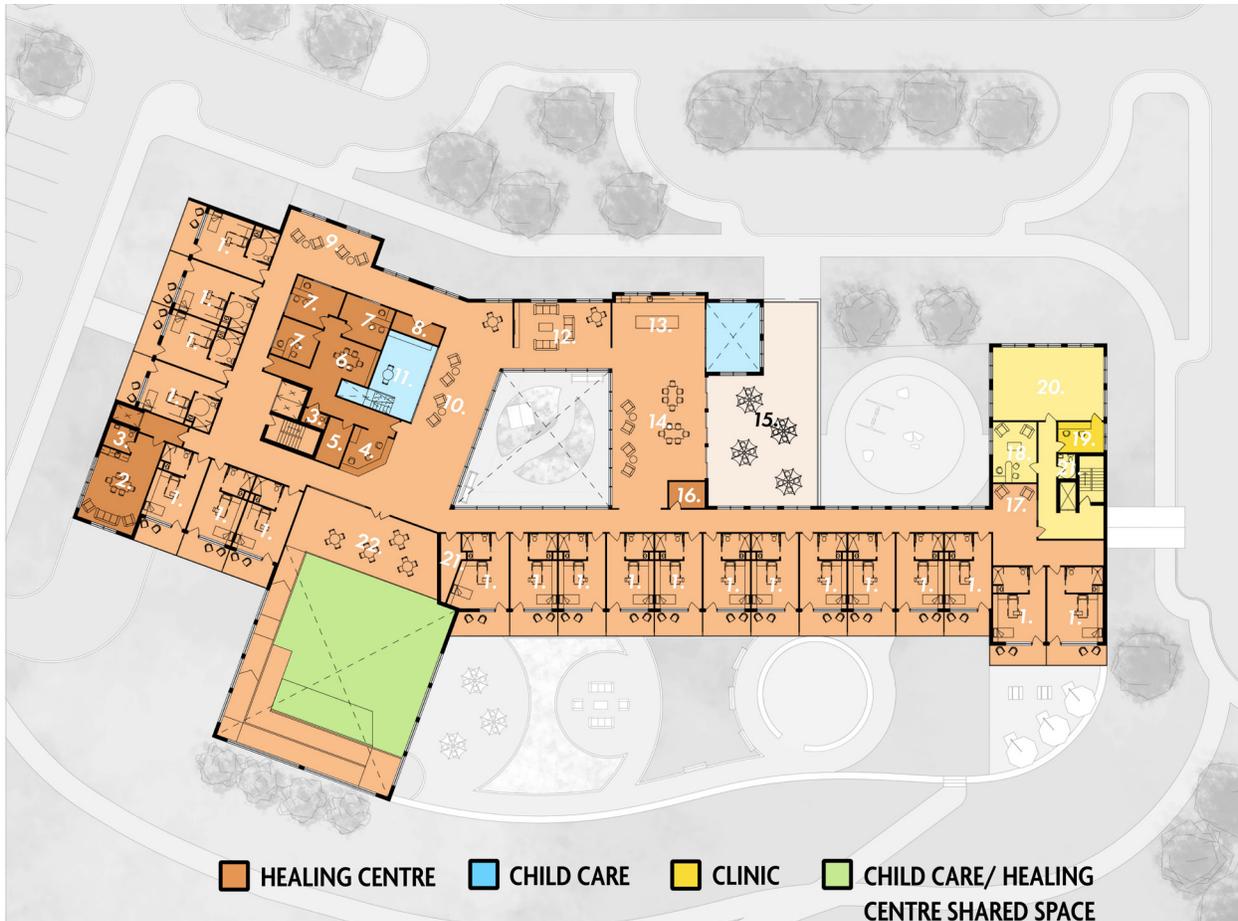
Having two storeys allows for a variety of interactions between children and seniors (Figure 3.16). An example of this is the Healing Centre having visual access to the pre-school loft area (1.). Another example is the views provided through the second storey windows down to the courtyard (2.). Spaces where active interactions happen between senior and child are in the green areas. The specificity of each program can be seen in Figure 3.17 and Figure 3.18.

**Figure 3.16 (Above):** South cross section of the Integrative Geriatric Centre.





- |                                |                                 |   |
|--------------------------------|---------------------------------|---|
| 1. Entry/ Vestibule            | 23. Gross Motor Space           | 44. Storage                             |
| 2. Lobby/ Waiting Area         | 24. Pre-School Room             | 45. Examination Room                    |
| 3. Printing Station            | 25. Toddler Room                | 46. Physician Office/ Consultation Room |
| 4. Healing Centre Front Desk   | 26. Infant Room                 | 47. Staff Room                          |
| 5. Admin Work Station          | 27. Infant Change Room          | 48. Janitor's Closet                    |
| 6. Admin Office                | 28. Infant Sleep Room           | 49. Natural Playground                  |
| 7. Staff Change Room           | 29. Childcare Laundry Room      | 50. Outdoor Classroom                   |
| 8. Supply Storage              | 30. Childcare Admin/ Front Desk | 51. Grass Play Area                     |
| 9. Healing Centre Laundry Room | 31. Childcare Waiting Room      | 52. Senior Outdoor Exercise Area        |
| 10. Clean Linen Storage        | 32. Childcare Lobby             | 53. Pergola Seating Area                |
| 11. Supply Storage             | 33. Stroller Storage            | 54. Outdoor Eating Area                 |
| 12. Receiving                  | 34. Entry/ Vestibule            | 55. Dining Hall                         |
| 13. Staff Washroom             | 35. Director's Office           | 56. Stage                               |
| 14. Janitor Closet             | 36. Staff Break Room            |   |
| 15. Kitchen                    | 37. Outdoor Equipment Storage   |   |
| 16. Cold Food Storage          | 38. Entry/ Vestibule            |   |
| 17. BF Washroom                | 39. Lobby                       |   |
| 18. Shared Atelier             | 40. Front Desk/ Admin           |   |
| 19. Reading Room               | 41. Nurses Station              |   |
| 20. Storage                    | 42. Waiting Lounge              |   |
| 21. Childcare Lunch Room       | 43. Outdoor Waiting Area        |   |
| 22. Courtyard                  |                                 |   |



**Figure 3.17 (Left):** First floor plan with arrows locating the main entrances for each program.

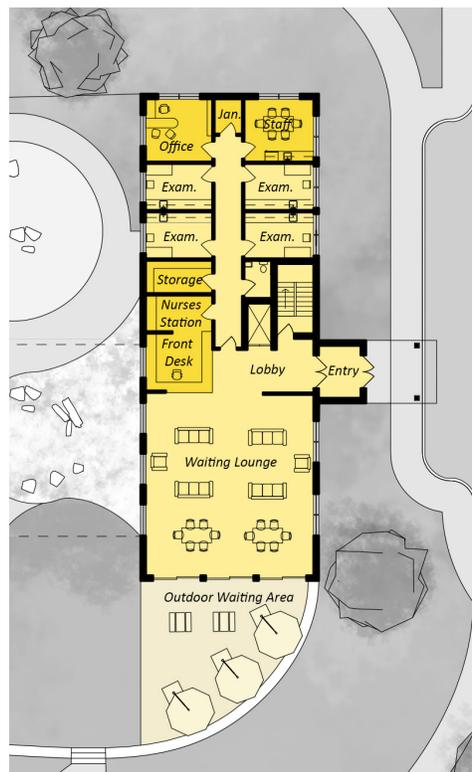
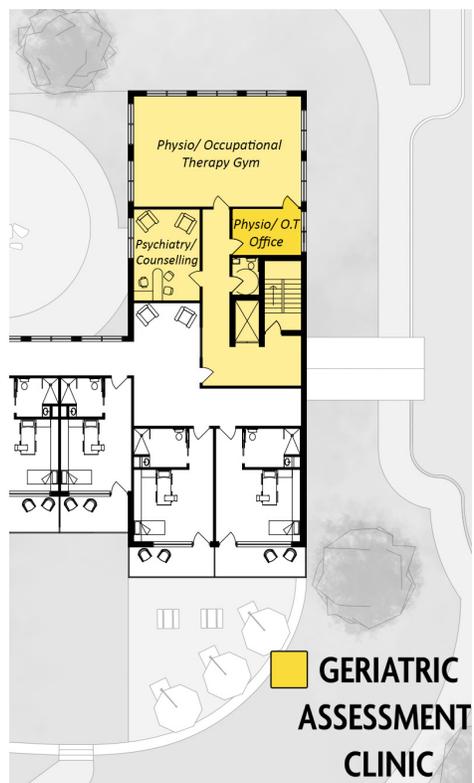
**Figure 3.18 (Above):** Second floor plan of the Integrative Geriatric Centre.

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Patient Room</li> <li>2. Staff Lounge</li> <li>3. Staff Washroom</li> <li>4. Nurses Station</li> <li>5. Medication Storage</li> <li>6. Staff Meeting Area/<br/>Medical Library</li> <li>7. Offices</li> <li>8. Storage Closet</li> <li>9. Seating Area</li> <li>10. Pre-School Loft Seating<br/>Area</li> <li>11. Pre-School Loft</li> <li>12. Entertainment Area</li> <li>13. Demonstration Kitchen /<br/>Tea and Coffee Bar</li> </ol> | <ol style="list-style-type: none"> <li>14. Patient Recreation<br/>Room</li> <li>15. Rooftop Patio</li> <li>16. Janitor Closet</li> <li>17. Rehabilitation Centre<br/>Waiting Area</li> <li>18. Psychiatry/ Counselling</li> <li>19. Physio/ Occupational<br/>Therapy Office</li> <li>20. Physio/ Occupational<br/>Therapy Gym</li> <li>21. BF Washroom</li> <li>22. Dining Hall Mezzanine</li> </ol> |
|--|--|

### Assessment Clinic

The entrance for the Walk-in Assessment Clinic (Figure 3.19 and Figure 3.20) is located on the eastern side of the site, upon entry to the building. Patients are asked to check in as they normally would at any other walk-in clinic. Thereafter, they are greeted with a large waiting room space with different seating options, which includes table seating, lounging chairs, seating for social interactions, television-oriented seating, couches, recliners etc. There are also many different activities to do while waiting, such as, choosing a book/magazine from the small library, playing cards/board games, watching television, or spending time on the outdoor patio. Large windows from the waiting room look upon the daycare's outdoor play area, thus allowing seniors to see the children playing outside. It is important that the clinic waiting room be adjacent to the children's play area as this may be a form of distraction to reduce anxiety prior to seeing medical personnel. Therefore, windows frame the activity happening in the outdoor play spaces (Figure 3.21). There are also large glass patio doors that slide open, allowing people in the waiting area to sit outdoors under shaded cover. Once called, patients go down a private hallway leading to four examination rooms. Each examination room has a wide skinny window six feet above floor height. Continuing down the hall is the physician's office and a staff lunch room.

Patients may also come in with pre-scheduled appointments to see a rehabilitation specialist. The Rehabilitation centre is located on the second floor; however, these patients share a waiting room with the Assessment Clinic. Once called upon by staff, patients may ascend the stairs, or take the elevator up for their appointment. In the rehabilitation centre, there are physiotherapists and





**Figure 3.19 (Upper Left):** Second floor of Geriatric Assessment Clinic and Rehabilitation Centre.

**Figure 3.20 (Lower Left):** Ground floor of the Geriatric Assessment Clinic.

**Figure 3.21 (Above):** Render of the walk-in Geriatric Assessment Clinic's waiting room. The large windows showcase children playing in their outdoor play area. To the left are large patio doors that allow the seniors waiting to go outside while they wait, all the while enjoying the view of Bethel Lake.

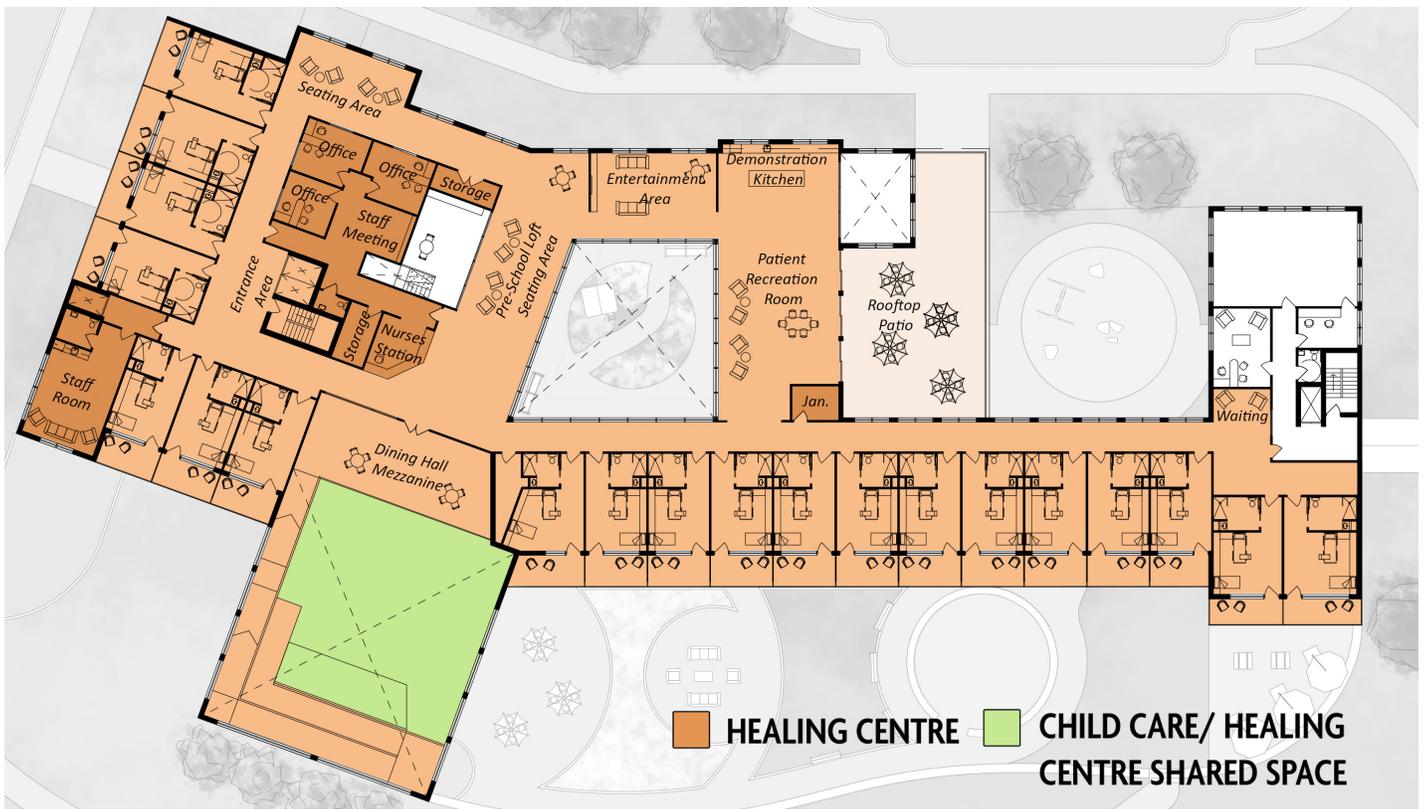
occupational therapist offices, a psychiatrist/ counselling space, and a patient recovery gym, all with large windows and blinds that may be opened or closed depending on the need for privacy. The rehabilitation amenities are both shared by the Healing Centre's patients and by those still receiving treatment who come in through the walk-in clinic with appointments. Having these programs share the rehabilitation services ensures that patients who have been released from the Healing Centre may still continue their treatment with the continuity of familiar staff and the building.

## Healing Centre

The main entrance for the Healing Centre is located near the north west corner of the building (Figure 3.22 and Figure 3.23). Once inside, there is a front desk and a waiting area. Admitted patients then go down the hall and up the elevator or up the stairwell to the second floor which houses most of the building's patient amenities. Upstairs they are greeted by nursing staff who lead them to their own private room. The majority of patient rooms have a lakefront view of Bethel Lake. All patient rooms have a secondary murphy bed for family members who wish to stay overnight. All medical equipment is hidden in custom built cabinetry in the room. Each patient has their own private bathroom with an accessible walk-in shower. Patients also have a private covered balcony with outdoor seating. Once settled in, patients have full access to the shared amenities of the building, which includes several social spaces such as the rooftop patio, small dining/games room, several seating areas scattered throughout the floor, and a kitchenette with sink, countertop appliances, as well as a small fridge. The kitchenette may be used for making tea or coffee, prepping small snacks, or can be used as a demonstration kitchen for patient assessments by the rehabilitation team. The large courtyard is the central focus of the Healing Centre found on the second floor above the daycare. This not only allows seniors to enjoy the natural light coming in, but also gives them the ability to see the children playing in the yard below. Thus, creating visual interest and giving off playful energy to those watching. Patients are encouraged to use the family style dining hall down on the first floor for all main meals. This is accessible via ramp, elevator or stairs. The dining hall has a stage where children of the Childcare Centre may perform for Healing Centre patients. Seniors also have access to the atelier and reading room spaces connected to the Childcare Centre facility down on the first floor. Healing Centre staff areas located on the main floor include administration offices, staff change rooms, kitchen, laundry room, janitorial spaces, and a loading dock. On the second floor, is the staff room, physician/nurses' offices and nursing station, as well as a meeting area, and janitorial storage spaces.

**Figure 3.22( Upper Right):** Second floor of the Healing Centre and the shared spaces with the childcare facility.

**Figure 3.23( Lower Right):** Ground floor of the Healing Centre and the shared spaces with the childcare facility.



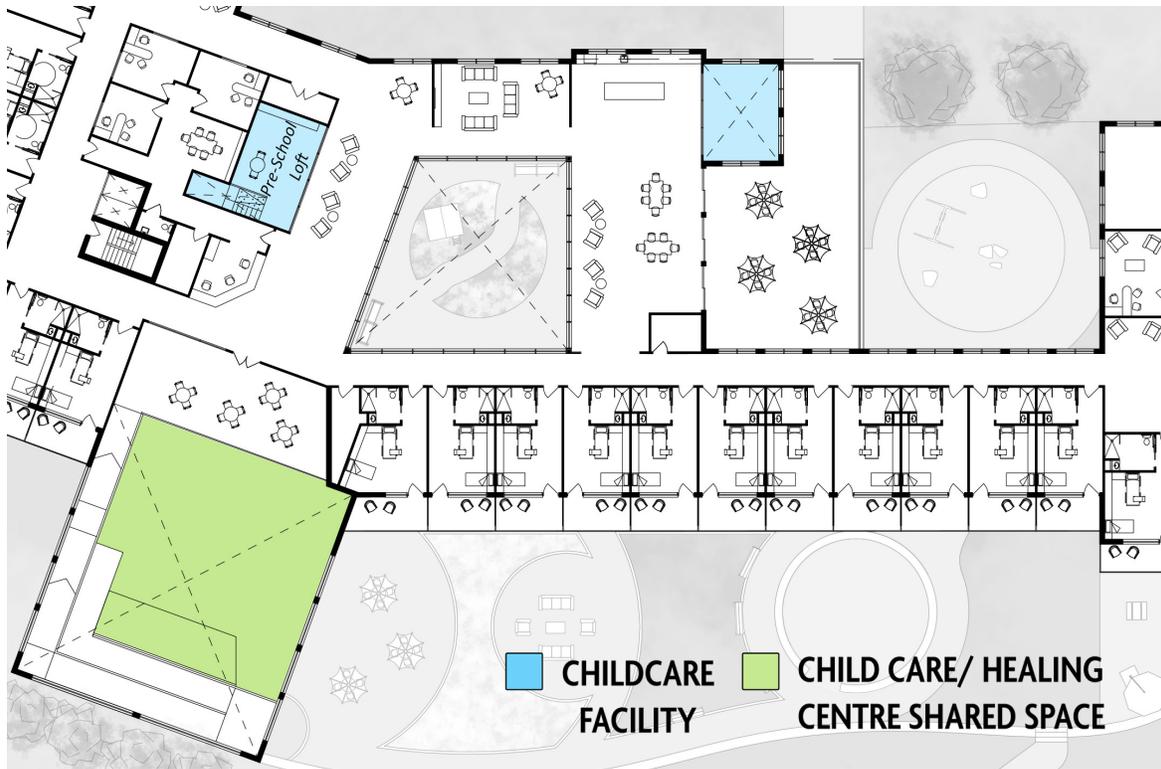
## Daycare

The main entrance for the Childcare Centre is located on the north side of the building (Figure 3.24 and Figure 3.25). The majority of the first floor is dedicated to the Childcare Centre. For the ease of children going inside and out to play, having them on the main floor was a priority. Creating easy access to the outdoors and having children connected to the ground is important to embrace a sense of exploration and wonder about the natural environment around them. Upon entry is the stroller storage, front desk and a waiting area for parents. Children then walk down the hallway into a large multi-purpose area with gross motor development activities and table space for eating and tabletop activities. The large space is divided by a courtyard where children can play outside fluidly when the weather permits it. (Figure 3.26) Off of the large multi-age group space are smaller classrooms specified for infant, toddler and preschool age groups respectively. These smaller spaces are geared toward age specific activities for each group. This includes activity spaces, quiet areas and nap zones, to name a few. In addition to these areas is a dedicated room for atelier type activities to interact with the Healing Centre's seniors. Attached to the atelier is a reading room open for both the Childcare Centre's children and Healing Centre's seniors. Doors to the Healing Centre's Dining Hall are located near the children's eating area to create easy access when children go into to perform little plays or are invited to join the seniors on special occasions. The Childcare Centre shares a kitchen with the Healing Centre to centralize food preparation for both programs.

Using the Reggio Emilia qualities as a guide in the design, the classroom acts as the third teacher. The views provided by the building may intrigue young minds. Large floor to ceiling windows on the south side of the building as well as the curtain wall around the courtyard provides a seamless view toward the lake, making the connection to the outdoors strong when in these spaces.

**Figure 3.24 (Upper Right):** Second floor of the childcare facility and the shared spaces with the Healing Centre.

**Figure 3.25 (Lower Right):** Ground floor of the childcare facility and the shared spaces with the Healing Centre.





**Figure 3.26 (Above):** This render showcases the gross motor playroom where children of all ages can play together. The central courtyard is shown dividing the spaces in the daycare. In the background is the shared reading room for seniors and children. To the right is the pre-school classroom area.



### 3.5.2 Site Design

Seemingly secluded, the site is central enough to the city that currently public transportation is available every 30 minutes. The parking lot has three entrances/exits; two on the north side of the property and one on the west side. The intent is to create easy circulation, whether a user is coming in for the Walk-in Assessment Clinic, the Healing Centre or the Childcare Centre. The city bus route can be diverted with ease to pass through the site and continue its journey along its regular path. Parking lots are provided for guests, staff and visitors. (Figure 3.27) Beginning with the Healing Centre, staff parking is located to the west of the building near the staff entrance. This parking lot uses permeable pavers to reduce the amount of asphalt on site. Reducing the asphalt, not only creates a greener and more aesthetically pleasing parking lot, but also helps filter pollutants in road runoff from entering vulnerable water systems nearby. In closer proximity to the building on the west side are spots available for the Healing Centre's overnight visitors. These spaces use asphalt due to easier maneuverability for those with accessibility issues. On the north side of the building are parking spots for short term visitors. A drop-off/pick-up area is provided in front of the main doors for both personal vehicles and ambulance services.

In addition, there are also drop-off/pick-up areas for the daycare as well as the Walk-in Assessment Clinic. The staff parking for the daycare is on the north east side of the building which is also shared by clinic staff and patients.



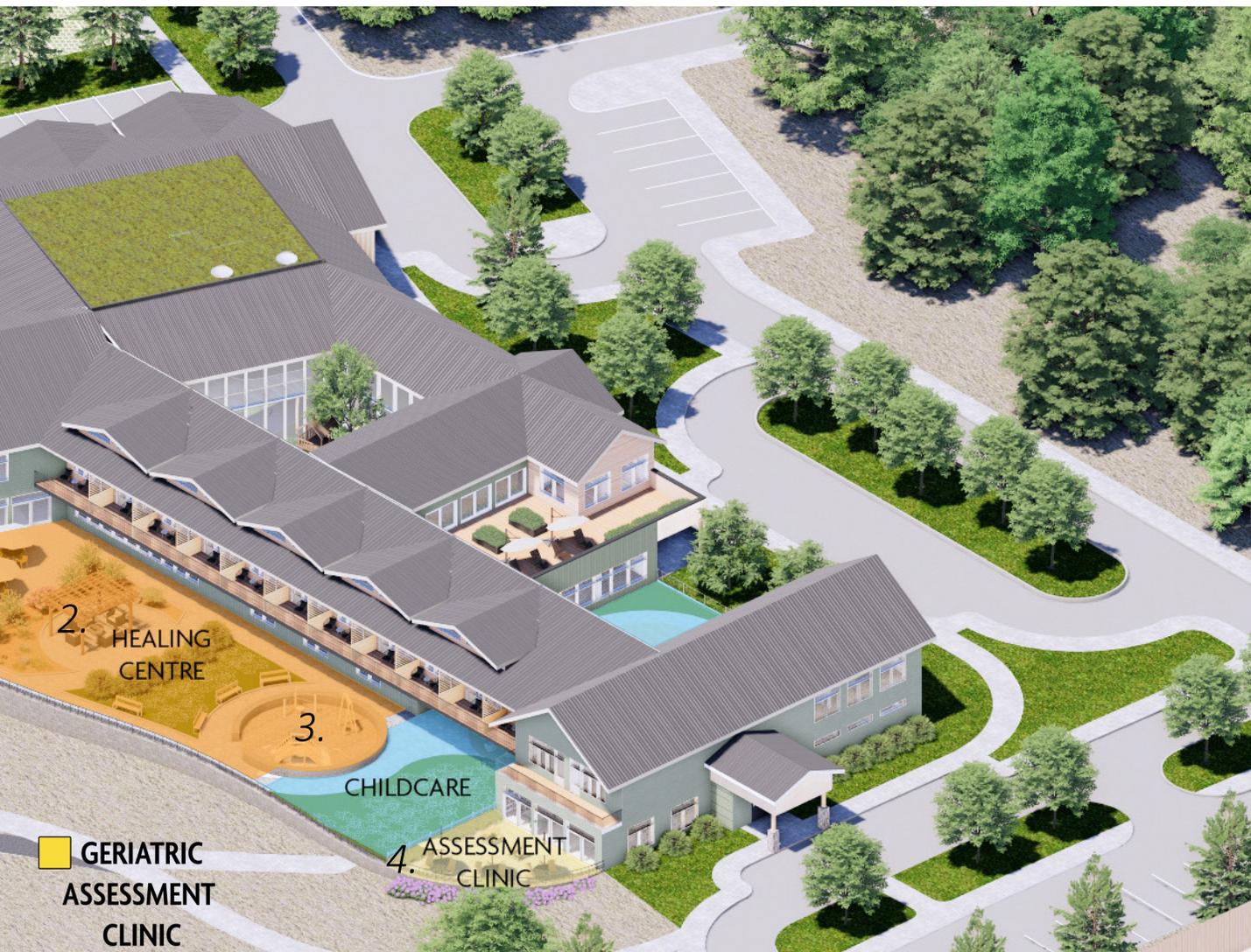
**Figure 3.27 (Above):** Site plan identifying the different parking lots surrounding the building.

There are three main outdoor spaces for people to use. These include an outdoor waiting patio for the clinic, an outdoor play area for the children, and a multi-purpose yard for the Healing Centre's patients (Figure 3.28 and Figure 3.29). Both the Healing Centre's yard and the clinic patio are adjacent to the children's play area. Elderly patients have the option to either stay in a more secluded area to get fresh air and enjoy the view or spend time watching the children play outside while they absorb some vitamin D. For clinic patients, they can sit back in shade covered seating looking out toward the calming scenery prior to seeing the doctor. The outdoor area for the Healing Centre has an eating area, a shaded seating area (pergola) and a senior exercise area, all attached by accessible walking paths to encourage movement by patients (Figure 3.30). The children's outdoor play area includes a nature-based playground, a shaded outdoor classroom, a grass area, and winding paths for scooters, bikes, and strollers.

**Figure 3.28 (Upper Right):** Outdoor areas for each program.

**Figure 3.29 (Lower Right):** 1• Outdoor eating area. 2• Pergola seating area. 3• Outdoor exercise area. 4• Outdoor waiting patio.







**Figure 3.30 (Above):** Render of the Healing Centre's outdoor exercise area



### 3.5.3 Biophilic Design Elements

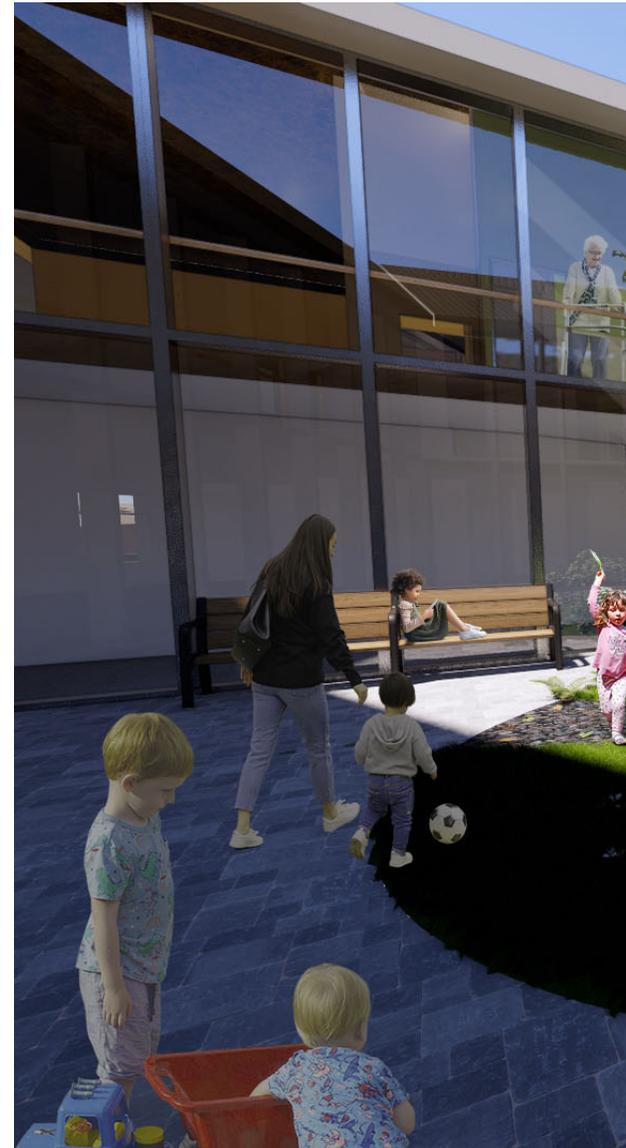
#### Natural Light

The presence of natural light pouring into the building is extremely important as a way to help patients, staff and visitors boost morale and be in tune with their circadian rhythms, a form of orientation in time. Within the building, the likelihood of being able to see a window providing this natural light is extremely high. (Figure 3.33) The inclusion of a courtyard in the centre of the building provides a lightwell ensuring that light penetrates interior spaces that would normally not gain any southern sun exposure.(Figure 3.31) The inclusion of a maple tree in the centre of the courtyard provides movement of light and the casting of interesting shadows that may attract the user's attention and create a sensate experience that one may have in nature; thereby reinforcing biophilic principles in interior spaces.<sup>60</sup> The foliage of the maple tree will undoubtedly change with the seasons. Its changing colours, loss, and regrowth of foliage will also provide a constant reminder of the seasons passing, thus enforcing our innate connection to natural processes.<sup>61</sup> Being in tune with natural processes are often relaxing, nostalgic, profound and frequently anticipated for those experiencing them.<sup>62</sup> In general, interior windows between two spaces allows for light to reach even further into the building, as they may not receive dynamic natural light, rather a more diffuse version of it. This "second hand light", creates settings with increased visual comfort in spaces such as in the kids loft space and office spaces for medical personnel.

60 William Browning, Catherine Ryan, and Joseph Clancy, 14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment (Terrapin Bright Green, 2014), <https://www.terrapinbrightgreen.com/reports/14-patterns/>.

61 Ibid.

62 Ibid.



**Figure 3.31 (Above):** Render of central courtyard. Children are shown playing while seniors are able to view them from the second storey of the building.

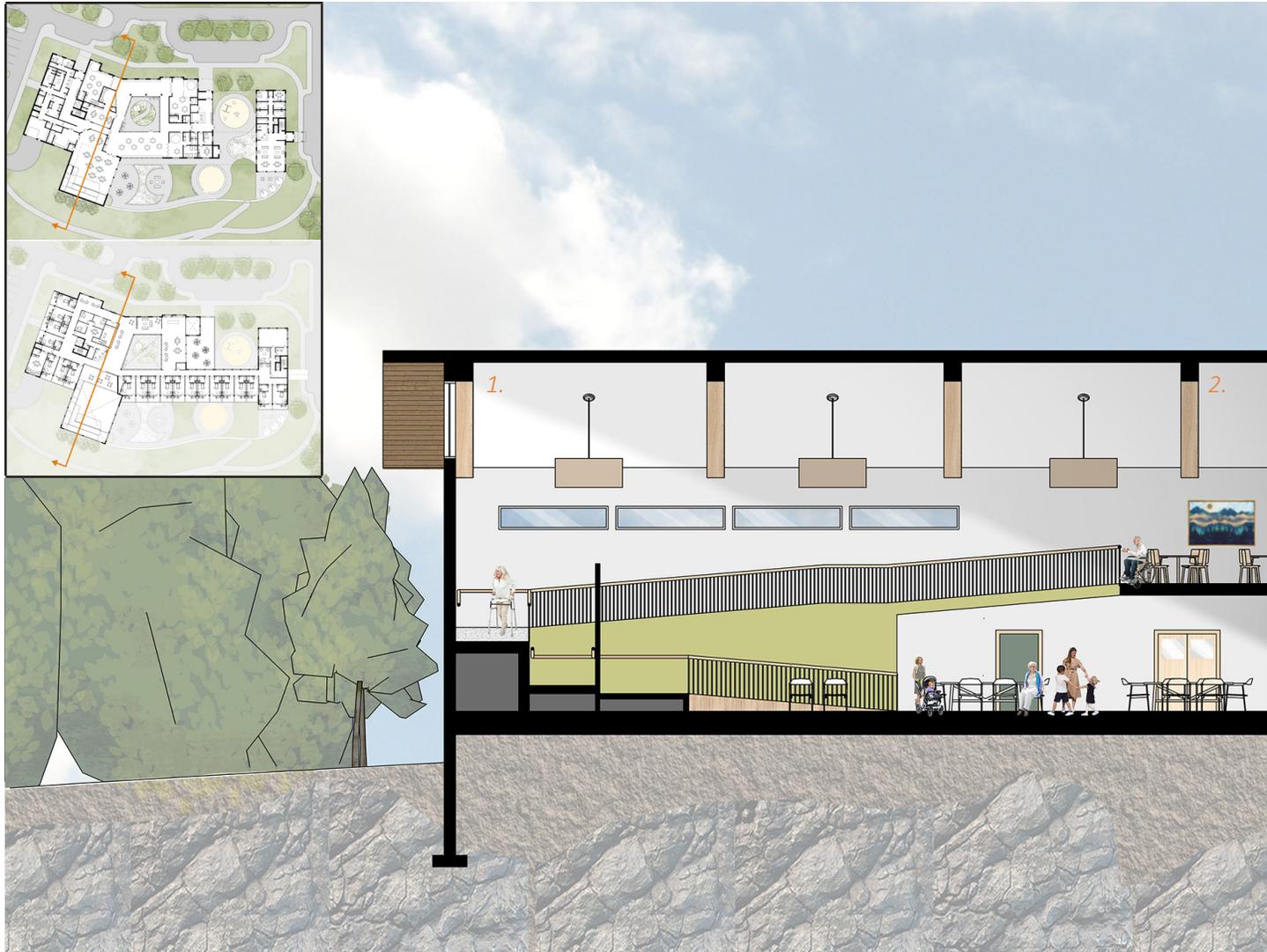


The inclusion of single loaded corridors in the building was important as this would prevent the feelings of disorientation that is too often found in hospitals. The addition of large windows on the north side of the hallway allows diffuse light to enter. In addition, skylights are present in the hallway above the children's outdoor play area, making it feel closer to an open-air breezeway than a stereotypical hospital hallway. (Figure 3.32) Patient Rooms have large windows at the foot of the bed so that recovering seniors may view the natural setting with ease. These large windows in addition to the dormer window above allows the room to be filled with natural light.



**Figure 3.32 (Above):** Render of the single loaded corridor passing above the children's outdoor play area. These large north facing windows allow soft diffuse light into the hallway.





**Figure 3.33 (Above):** Section of the building passing through the dining hall (1.), mezzanine (2.), nurses' station (3.), kids loft (4.), atelier and reading room (5.), and the pre-school room (6.). Natural light can be seen passing through the building's windows.



### Views

In addition to watching the courtyard change over time, patients have been given a front row experience to the scenery of the lake changing with the seasons. The majority of patient rooms face Bethel Lake, thus creating a direct visual connection to the natural environment. In fact, patients have the option to even step outside onto their own personal covered balcony for the chance to experience the refreshing lakeside breeze. (Figure 3.35). Healing Centre patients also have the opportunity to use the rooftop patio to bask in the sun and partake in raised planter bed gardening activities, while being able to see the children playing in the yard below. (Figure 3.34) Views directed toward activities happening outside prevents boredom and creates mental stimulation.



**Figure 3.34 (Above):** Render showing the outdoor rooftop patio with raised planter beds that Healing Centre patients can garden in.





**Figure 3.35 (Above):** Render of a patient on their own private balcony attached to their room.



### Interior Design & Building Materials

The intent of the building is to remove the clinical feel of a stereotypical health care building which in most cases causes patients unwanted stress simply by its architectural aspects. Upon the approach to the building, patients see a large structure with home-like features such as gable roofs, window shutters, double storey building height, with recognizable residentially used cladding. These exterior façade materials include painted wooden siding, red brick, and natural wood materials. With the use of these familiar elements, elderly patients are less likely to associate a clinical environment to the exterior of the building, thereby reducing the amount of stress prior to entering the building.

The use of green and neutral colours inside the Healing Centre helps to create the feeling of calmness, promotes a connection to nature, and reduces stress. According to a research paper conducted in 2019 aptly named *Effects of Color in Interior Design*:

“Green is the color of nature, restful and refreshing. It has a great healing power which is one of the reasons why it is dominant color in hospitals interiors. Green light reduces pressure, expands capillaries, stimulates the endocrine glands and relieves insomnia. Pale green is the most relaxing and calming color in the spectrum.”<sup>63</sup>

The use of green in the building is used to accent important moments to aid those who may have visual impairments. Attention with the use of colour is drawn to important doorways, interesting views and helps in terms of wayfinding. Moments include: areas of planned intergenerational interaction, wayfinding to handrails, and attention to patient room doors. As for the rest of the décor, nature inspired paintings and photographs have been utilized in spaces that are lacking the direct connection to the outside. Similarly to direct access to nature, emulating nature also provides positive benefits to the mind and body.

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63 Aleksandra Ćurčić et al., ‘Effects of Color in Interior Design’, vol. 35, 2019, 867–77, <https://doi.org/10.14415/konferencijaGFS2019.080>.

This facility is a mass timber building, where exposed wood is highlighted in the building. Most evidently in the dining hall, large glulam scissor trusses are exposed to create visual interest for building users. The double height space allows a mezzanine to look upon the wooden trusses at a closer glance (Figure 3.36 & Figure 3.37). Natural wood floors are present on the second floor to create a warm and homelike feeling for patients since they will be staying for long periods of time. The use of wood throughout the building, from structural elements to furniture, aids in the warm feeling that this healthcare facility is trying to emulate. Removing very industrial materials will consequently remove the sterile, cold, and institutional feeling that many healthcare buildings tend to struggle with.

#### Natural Ventilation

All patient room windows are operable, giving patients some control over the temperature in their rooms. Natural ventilation makes spaces feel more refreshing, active and alive.<sup>64</sup> As temperature varies depending on user preference, having a space feel comfortable is of utmost priority. As mentioned in *14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment*, a culmination of information on biophilic design elements:

“Research shows that people like moderate levels of sensory variability in the environment, including variation in light, sound and temperature, and that an environment devoid of sensory stimulation and variability can lead to boredom and passivity.”<sup>65</sup>

Having slight thermal differences in the building, such as sitting next to an open window or enjoying the sun’s radiating heat through a window, makes the patient’s experience more interesting, thus keeping the mind stimulated which in turn can fight against cognitive decline.

64 Browning, Ryan, and Clancy, *14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment*.

65 Ibid.



**Figure 3.36 (Above):** North elevation of the Integrative Geriatric Centre. 1 • The entrance to the walk-in Geriatric Assessment Clinic. 2 • The entrance to the childcare facility. 3 • The entrance for the Healing Centre. 4 • Staff entrance for the Healing Centre.



**Figure 3.37 (Above):** South elevation of the Integrative Geriatric Centre. The building has recognizable elements such as a gable roof, dormers, balconies, and cladding materials (brick, painted wood siding and natural wood siding).



### 3.5.4 Senior Friendly Design Elements

Using the senior friendly hospital principles to inform design was critical in creating the design of the building. Senior friendly design includes: resilience, independence and quality of life; compassion and respect; informed and empowered older persons and families; person- and relationship-centered partnerships; safety and security; timely, equitable, and affordable care; and finally evidence informed information.<sup>66</sup>

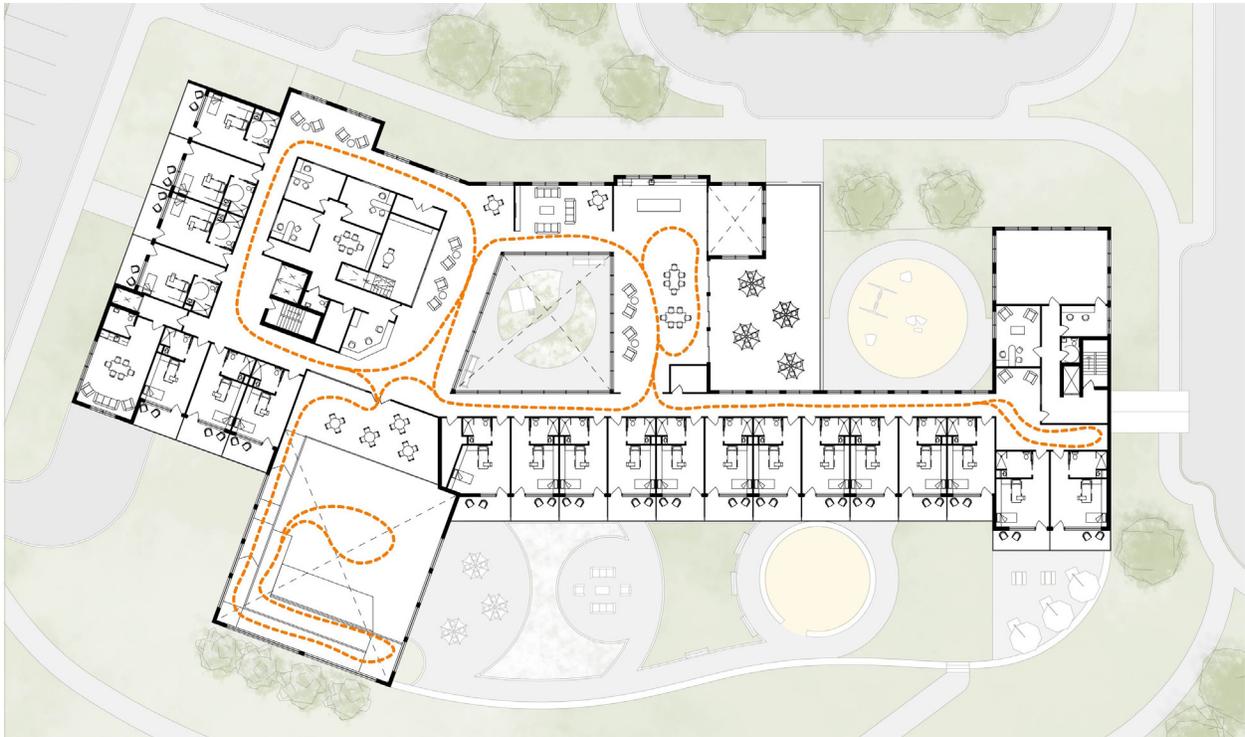
The building encourages patients to walk around in indoor settings due to its looping hallways (Figure 3.38). As stated by Lionel Cosin, an orthopedic surgeon working with elderly patients, “bed is bad”.<sup>67</sup> Meaning that movement to maintain or improve functional abilities is important. The intention is to have patient amenities spread throughout the building to promote the movement of elders. Seniors may set goals of small walks or several indoor laps in the building depending on their level of mobility. To increase the feeling of independence, the addition of a kitchenette is provided. Patients can make themselves a cup of tea or coffee similarly to what they may do at home on a daily basis, thus reinforcing the idea of independence which helps combat cognitive decline. The introduction of a ramp system down to the large family style dining hall makes patients feel as though they can move around independently, all the while enjoying the building and its design (Figure 3.39). The intention for the ramp is to make it the most interesting way to get to the dining hall, again encouraging senior mobility and fighting against functional decline.

A way to make seniors more comfortable while they stay in the Healing Centre is to include a secondary bed for family members within their room. This is important as a form of familiarity for the patient. Including family members

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66 ‘Senior Friendly Hospitals | Regional Geriatric Program of Toronto’, 28 November 2017, <https://www.rgptoronto.ca/initiatives/senior-friendly-hospitals/>.

67 J. E. Morley, ‘A Brief History of Geriatrics’, *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 59, no. 11 (1 November 2004): 1132–52, <https://doi.org/10.1093/gerona/59.11.1132>.



**Figure 3.38 (Above):** Second storey plan showcasing the areas in which Healing Centre patients can walk around for indoor exercise.

in the recovery journey for these elders is an essential method in reducing stress in unfamiliar environments, all the while referencing one of the seven principles of senior friendly hospital design as a way to empower older persons and their families. This reduces the chances of cognitive decline by increasing familiarity and decreasing stress.

Boredom in the Healing Centre is something to be avoided, therefore **several pockets** are created for socialization purposes such as: the small dining room, the kitchenette, the seating areas scattered throughout the building, the outdoor spaces, etc. It is commonly known and re-emphasized in a short article by Mayo Clinic, “Socializing not only staves off feelings of loneliness, but also it helps sharpen memory and cognitive skills, increases your sense of happiness and well-being, and may even help you live longer.”<sup>68</sup>. By providing more comfortable and accommodating opportunities for social interactions, patients can fight against their feelings of loneliness thereby improving mental well-being and decreasing cognitive decline.

68 Vivien Williams, ‘Mayo Clinic Minute: The Benefits of Being Socially Connected’, Mayo Clinic News Network, 19 April 2019, <https://newsnetwork.mayoclinic.org/discussion/mayo-clinic-minute-the-benefits-of-being-socially-connected/>.

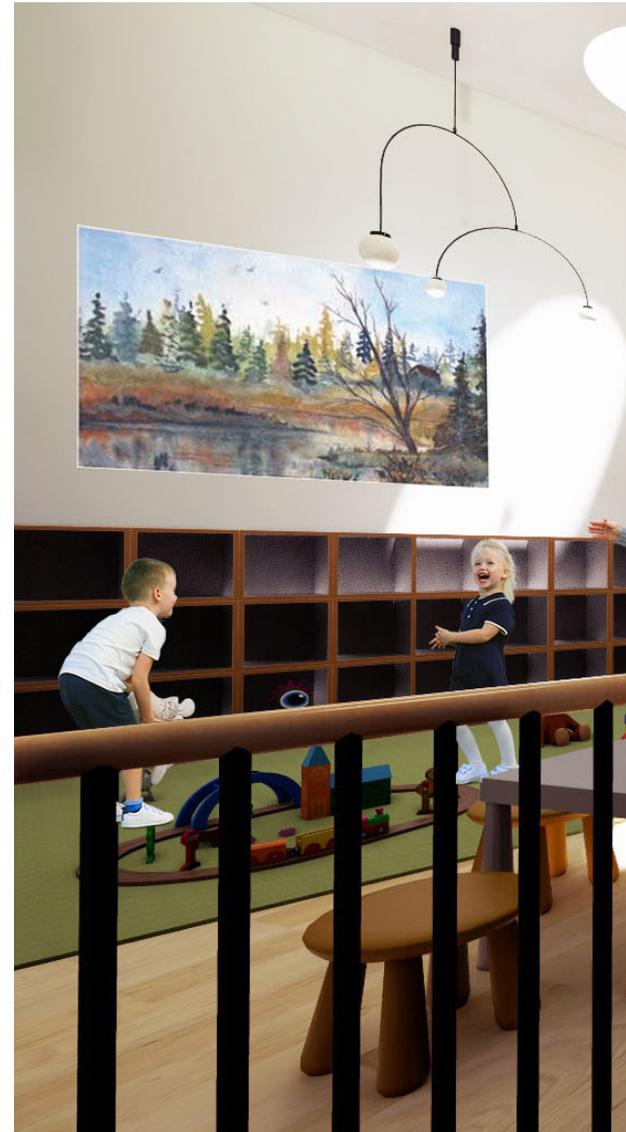


**Figure 3.39 (Above):** Render of the mezzanine space above the dining hall.



### 3.5.5 Intergenerational Interactions

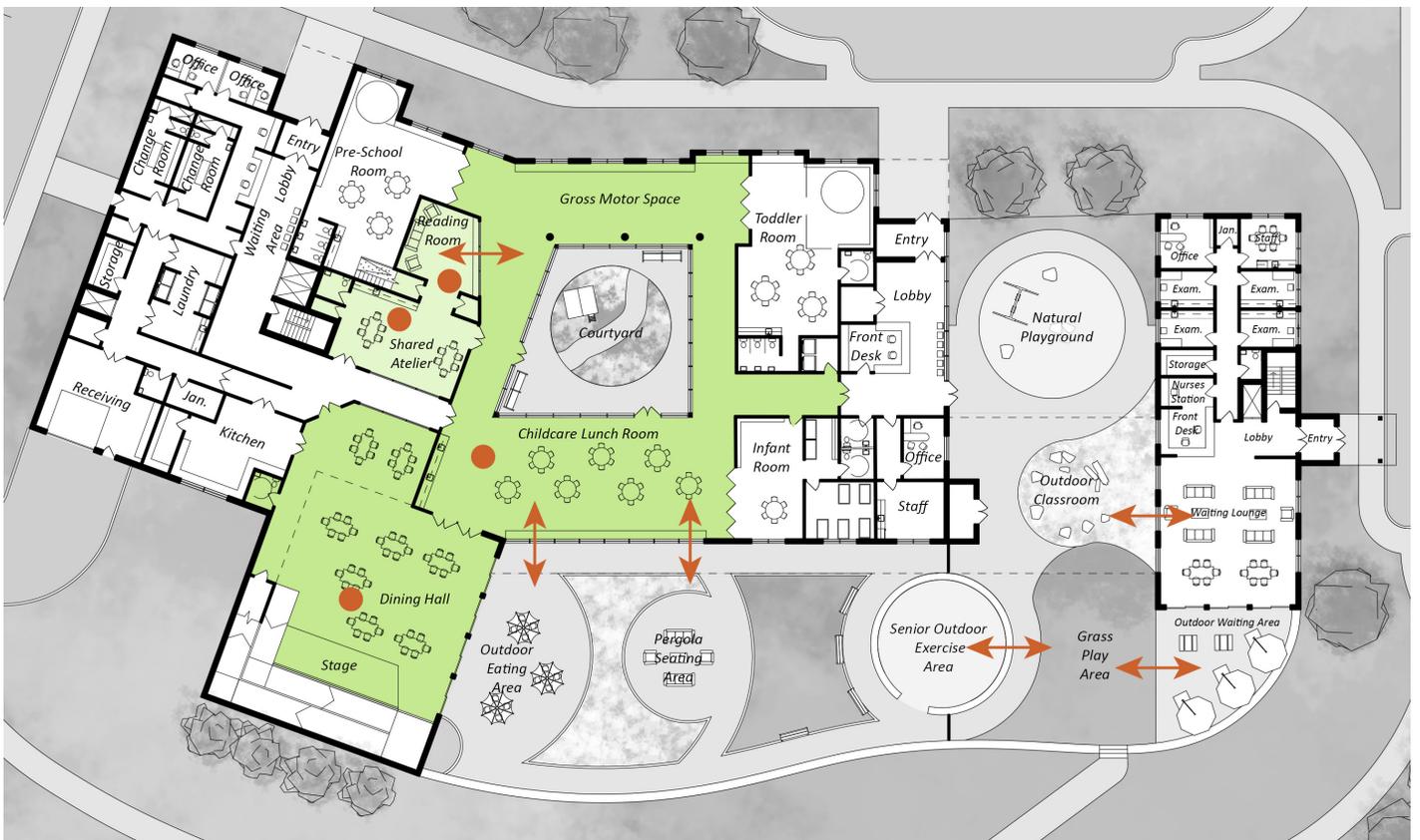
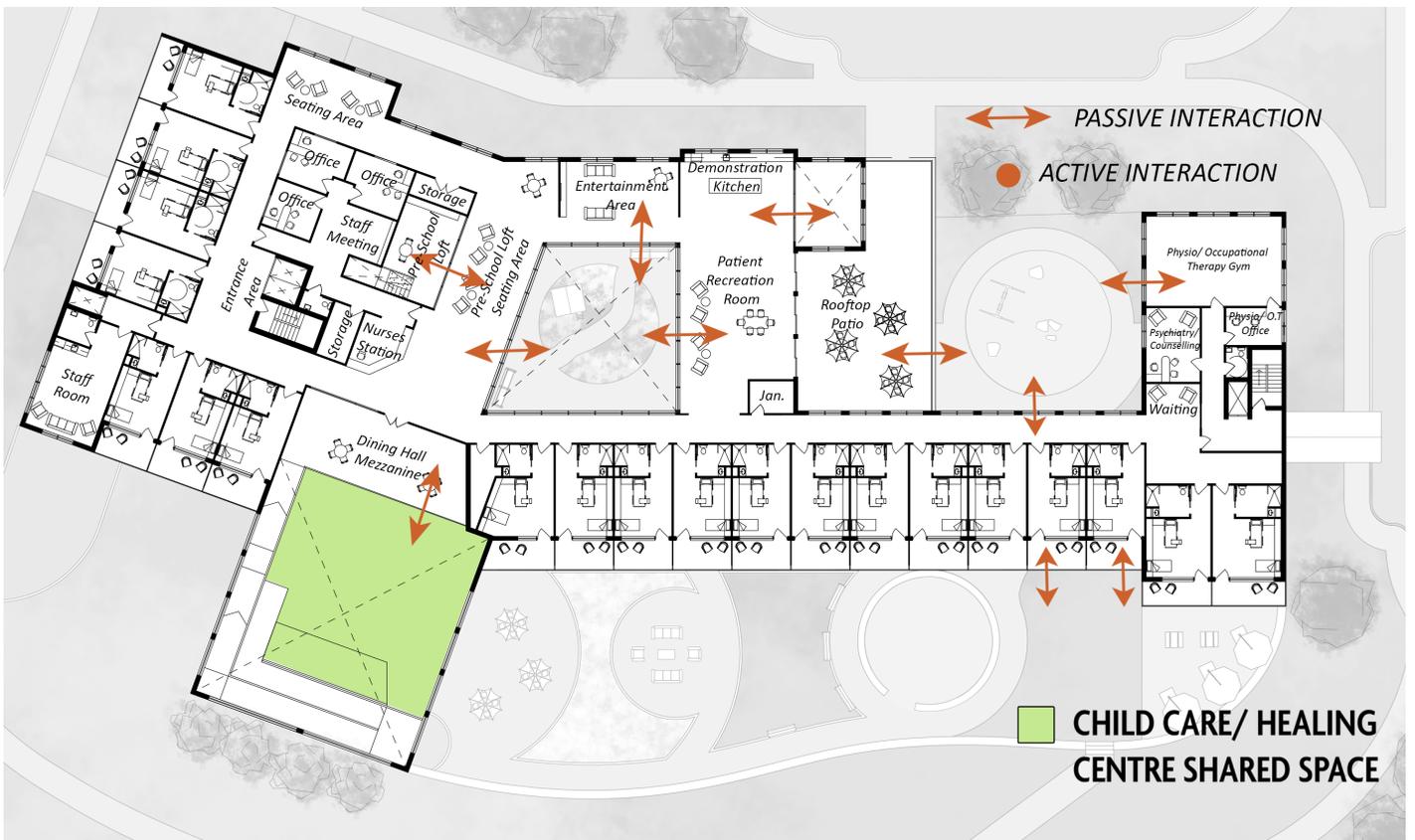
The creation of architectural moments for intergenerational interaction between seniors and children is a great way to provide positive distraction for the seniors as well as create educational moments for the children. The creation of specific moments within the building is important so that the privacy of seniors remains of utmost importance. However, in social settings, these visual and physical interactions can occur (Figure 3.41 and 3.42). Moments of visual interaction are often provided through strategically placed windows that are meant to showcase playful and positive moments for both seniors and children. By using architectural moments, these interactions do not always need to be planned by either party's care takers. Having solely visual connections reduces auditory discomfort for seniors who do not want to participate in intergenerational interactions or who may find children overwhelming. An example of this is the children's loft which incorporates a large window that separates a Healing Centre seating area with a playroom accessed by a climbing wall for the children (Figure 3.40). However, for those who are interested in pursuing social interactions through forms of playful activities, spaces to participate are there to accommodate. These spaces include the dining hall, atelier space, and reading room. The Healing Centre may also invite the children into the large dining hall for celebratory events, evoking excitement from both generations. Creating moments between generations, not only combats boredom, but also encourages creativity by stimulating the mind in unexpected playful ways. Moments of interaction and playfulness between the generations are what create joyful energy within the building as both child and senior benefit from it.



**Figure 3.40 (Above):** Render of the kids loft. Since the kids loft is on the second floor, seniors in the Healing Centre have the opportunity to interact with them visually as they play.



Lafrenière | Care & Cure: Reducing Cognitive Decline Among Elderly Patients in Healthcare Settings by way of Caring Architectural Principles



## Conclusion

**Figure 3.41 (Upper Left):** Second floor plan of passive and active interactions for intergenerational relationships in the building.

**Figure 3.42 (Lower Left):** Ground floor plan of passive and active interactions for intergenerational relationships in the building.

Using biophilic design principles, the framework for senior friendly hospitals, and thinking of moments for intergenerational interactions has inspired the creation of the Integrative Geriatrics Centre as a place devoid of typical institutional architectural spaces found in healthcare buildings. Seniors who seek care through this centralized healthcare facility will be less likely to experience stress compared to what is typically found in hospitals, thus reducing the chances of severe cognitive and functional decline.

# CONCLUSION

Architecture holds great responsibility for the happiness and well-being of the individual user both in healthcare settings and beyond. As explored through the implementation of architectural strategies that focus on biophilic design principles, senior friendly design and intergenerational interactions, this thesis showcases that the physical recovery of a patient and their mental well-being are closely tied to the architectural environment. Creating spaces that diminish cognitive decline include thinking of the user experience first, comparatively to our past healthcare philosophies of making spaces primarily dedicated to the physician. Having spaces that feel like a home environment helps in the reduction of stress which affects patient's cognitive function and emotional responses. De-institutionalizing healthcare spaces will in turn make patients more comfortable. Integrating a home like atmosphere where patients have independence, areas for socialization and the feeling of safety is important for their mental well-being. Seeing that this project is for geriatric patients, understanding their perception of architectural space is important as well as understanding their capabilities. Making these spaces joyous and fun helps in uplifting patients' spirits. Positive distraction in the form of different activities, both planned and spontaneous, are key to reducing boredom and depression considering seniors are in extremely vulnerable states. The introduction of children, as key elements in the building, is sure to create moments

where patients will no longer feel as though they are in care settings, but rather moments where special memorable relationships between elder and child are formed.

The introduction of a new model for continuing care in the Greater Sudbury region is crucial due to the de-centralized nature of the current geriatric care system (Figure 3.43). Presenting an easily accessible assessment clinic will aid in the current load that the hospital currently faces in its emergency department thereby helping reduce stress on Sudbury's healthcare system. The need for these programs along with the support of an integrated childcare facility creates moments where healthcare no longer needs to feel as sterile or isolated from other community programs.

In conclusion, with the aid of an intergenerational childcare facility, the use of biophilic design and using the provincial guidelines on senior friendly hospitals results in a building that cares for seniors who are experiencing cognitive decline.



**Figure 3.43 (Above):** Aerial perspective of the entire site of the Integrative Geriatric Centre.



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